# THE AMERICAN GAS LIGHT JOURNAL

PUBLISHED WEEKLY, AT No. 42 PINE STREET.

VOLUME XCIX., No. 4. Whole No. 1,990. | NEW YORK, MONDAY, JULY 28, 1913. | Subscription, $3 Per Year. $4 Canada, $5 Foreign.



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*Riter-Conley Manufacturing Company*

STEEL CONSTRUCTION

*Pittsburgh*



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# THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

## BUILDERS OF

## THE STANDARD DOUBLE SUPERHEATER

## LOWE WATER GAS APPARATUS.

ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { **PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.**

PRODUCING { **UNIFORM RESULTS. HIGHEST EFFICIENCIES.**

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## Removal of Carbon Bisulphide by Hot Purification.

[Abstracted from a paper prepared by MR. CHARLES C. CARPENTER, D.Sc., M.Inst.C.E., for the Annual Meeting Société Technique du Gaz en France.]

The purification of coal gas by heating it in contact with iron was first suggested by G. H. Palmer, who in 1819 erected an installation for this purpose; but the attempt was not successful. The presence of carbon bisulphide as an impurity in coal gas was suspected a year later, when W. T. Brande discussed a scheme for the purification of gas by causing it to pass through tubes heated to redness. He stated that in examining coal gas he had often noticed the formation of sulphurous acid during combustion. Since the gas examined by him contained no sulphureted hydrogen, he was led to suspect the presence of some other sulphur compound; and he was confirmed in this belief by the odor of carbon bisulphide evolved from gas mains in streets which had been opened. In 1852, the Court of Common Council, City of London, made the first appointment of an independent chemist for the examination of the gas supplied to the public. The choice fell upon Dr. Henry Letheby, who in his reports frequently drew attention to the sulphur, existing as carbon bisulphide, in the gas supplied to the Metropolis, and attributed the cause to the carbonization of the coal at too high a temperature. The actual presence of carbon bisulphide in coal gas was proved for the first time in 1853 by A. Vogel, who passed a current of coal gas free from sulphureted hydrogen, through an alcoholic solution of potash. After concentration, and the addition of acetate of lead, a dark coloration was obtained.

The deleterious effects of the products of combustion upon fabrics, books, etc., have been noted. No practical steps were taken for the systematic extraction of sulphur compounds till 1860, when a suggestion was put forward by the Rev. W. R. Bowditch, the Vicar of St. Andrew's, Wakefield, who 6 years before had taken out a patent for "improvements in the purification of coal gas." The essential part of his invention was this claim in his specification: "The passage of coal gas over slaked lime, beaten clay, or hydrated peroxide of iron, heated below redness, as described above, by which the sulphur compounds contained in what is now called 'purified gas' are decomposed and given off as hydrogen sulphide and carbonic acid; the hydrogen sulphide thus produced, together with the carbonic acid and ammonia, being removed by the ordinary methods of purification." He stated that the best temperature in practice was between 116° and 216° C.—varying according to the quantity of impurity present in the gas.

Bowditch had a conference with a number of managers of gas works, at which he drew their attention to this subject. He estimated that the maximum cost would be 35 centimes per cubic meter ($1.96 per 1,000 cubic feet) of gas; but he pointed out that the result would be a much larger consumption of gas, and an additional profit, which would more than compensate for the greater cost involved in the adoption of his process. He added that, as a result of the simplicity of his method, consumers could put up small installations in the cellars of their houses, to remove, under their own supervision, the deleterious properties in the gas.

In 1861, Mr. A. Kitt heated gas in contact with refractory bricks, for the destruction of carbon bisulphide, and found that when taking gas of 14 candles, the illuminating power was reduced to 8.5 candles on heating to 150° C., and that two further consecutive heatings effected a reduction to 5.75 candles. He called attention to this loss in illuminating power as proving the impossibility of the commercial application of such a method. In the same year, Mr. Bowditch patented a process for passing gas over metallic oxides heated to from 50° to 150° C., afterwards purifying it by means of lime or oxide of iron.

In 1863, Mr. G. Bower took out a patent for the use of heated spongy iron for the purpose of decomposing and removing sulphur compounds. In his invention, the coal gas, purified or crude, was led through a heated retort containing iron or oxide of iron, and the sulphur compounds were decomposed, the sulphur entering into combination with the iron.

In 1864, the London Gas Companies consulted Mr. T. G. Barlow on the removal of the sulphur impurities. Mr. Barlow made experiments in collaboration with Mr. Albert Ellissen, the chemist at the experimental works of the Paris Gas Company. Their report set forth that the sulphur impurity in gas varied considerably according

to the coal used. While coal from the neighborhood of Valenciennes gave 17.3 grammes per cubic meter, that from Staveley, in England, yielded 50.4 grammes, though the two coals contained almost the same quantity of sulphur. The two experimenters were of opinion that only careful manual sorting of the coal was a satisfactory remedy.

In 1871, Professor A. G. Vernon Harcourt obtained provisional protection for a process having for its object the conversion into hydrogen sulphide of the sulphur in coal gas. For this purpose he used a mass of iron turnings, or wire, introduced into the retort after it was charged with coal. He assumed that the metallic mass would decompose the carbon bisulphide in the gas, forming hydrogen sulphide, which would be readily removable. An alternative method consisted in bringing the gas to a higher temperature before purification, by passing through tubes heated dark red, and partially charged with material suitable for conducting the heat and presenting ample surface.

After other experiments with chemical absorbents in the cold, Harcourt returned to this method of heating, and, in collaboration with Sir W. Siemens, the process was tried on an industrial scale in a gas works in London in 1874. The furnace employed was a modification of the Dr. Siemens recuperative system. The gas was heated by passing through one of the recuperators, and afterwards over a mass of heated quartz flints, after which it was brought to ordinary temperature by passing through another recuperator. The operation was performed in a way which was opposite to the usual practice. Considerable leakages occurred in the apparatus, in consequence of fracture of the irons by the heat of the furnace, and the experiments were abandoned.

Harcourt found that the chemical method was a very convenient laboratory process for the estimation of carbon bisulphide in coal gas. For this purpose, a Florence flask was filled with quartz flints strongly heated by a gas burner, and the resulting gaseous products were passed through a normal solution of lead—the coloration produced being compared with a standard tint. In a later apparatus, he suggested the use of balls of refractory earth with oxide of iron, heated in a current of gas, to reduce the oxide to the metallic state. Platinized pumice was aventually used in their place. He thought the process could be applied on an industrial scale, but that the question was one for the ingenuity of the engineer rather than for the chemist.

In 1876, Mr. T. B. Redwood patented the use of copper turnings to improve the quality of coal gas.

In 1878, two gas engineers, J. and F. W. Clark, obtained provisional protection for what seems to be a serious attempt to apply the heating method on an industrial scale. They remark that, though the elimination of carbon bisulphide was readily done in the laboratory, no practical process had succeeded on a large scale. They found the principal cause of failure was the difficulty of maintaining, at a high temperature, a large volume of gas, in a chamber of considerable size. But that, by dividing the gas into currents of moderate volume, and by causing it to traverse long narrow passages heated by an outside source, the gas could be maintained at the temperature, and for the time necessary for decomposition. They constructed an apparatus in which the gas passed through iron tubes and, with the object of easy regulation of the temperature and of keeping the latter sufficiently high without injury to the tubes, they did not heat the latter directly, but placed them in a chamber of hot air. The tubes in which the gas underwent decomposition were filled with coke or wood charcoal to increase the conducting surface for the reaction. The hydrogen sulphide evolved was immediately absorbed by oxide of iron. Some further details of these experiments were communicated 2 years later by one of the inventors, who stated that his experiments had been made with a plant capable of raising the temperature of 1,400 to 1,700 cubic meters of gas from 15° to 320° C. Yet they found that the carbon disulphide was reduced only 25 per cent. In view of this poor efficiency, loss of gas, the reduction in illumina ting power, the great expense of heating, and the dangers attending the process, they abandoned the method as impracticable.

A still more remarkable process was that for which a patent was granted (1879) to J. V. Quaglio. This was the initial trial of using a metallic salt for the decomposition of carbon bisulphide, and its conversion into hydrogen sulphide. For this purpose, the inventor suggested platinum in the form of metal or sponge, iridium, palladium, ruthenium, or rhodium; also, metallicnickel and metallic iron in fine powder. He proposed to use balls of refractory earth moistened in a solution of chlorides of the metals; the balls to be in iron tubes, heated by the gas from a generator, by hot air, or by superheated steam. The regeneration of the metallic compound in the interior of the apparatus was done by passing a current of air through the tubes while they were still hot. The apparatus could be placed before the ordinary purifiers, or be employed after the hydrogen sulphide had been removed. It was impossible for him to ascertain whether this process was ever worked on an industrial scale.

In 1883, trial was made, on a large scale, in London, of a project for mixing slaked lime with the coal before charging the retort. This suggestion was abandoned, but it has been revived with success at Cheltenham.

In 1884, Mr. L. T. Wright proposed to add air varying in quantity up to 2½ per cent. in proportion to the quanity of sulphur contained in the gas—heating the mixture to between 200° and 260° C., and passing it over animal black.

A modification of the Harcourt-Siemens system has been described quite recently by Mr. E. L. Hall, of Portland (U. S. A.) In this process, two chambers of refractory bricks are used, heated alternately, by producer gas; the lighting gas being directed across one or the other of these chambers. The gas to be purified is heated to a temperature of 400° to 900° C., with or without the addition of steam, and the hydrogen sulphide is removed by the usual method. If the proportion of sulphur is very high, the gas may be led through a second apparatus.

Apart from the exceptions mentioned, engineers appear to have lost sight of the heating process for the decomposition of carbon bisulphide, and to have confined their attention to its extraction by lime. The use of this material has always involved great difficulties and inconvenience; and when the compulsory elimination of the sulphur compounds in gas was abolished by Act of Parliament, and gas undertakings were no longer restricted in this respect, they were eager to take advantage of their liberty. The great importance of the question from the point of view of increasing the popularity of gas was nevertheless not lost sight of by the South Metropolitan Gas Company; and Mr. E. V. Evans, their Chief Chemist, was instructed to again study the question. In these researches, catalytic reactions were reproduced on the laboratory scale in the latter part of 1908; and the following year an installation on a large scale was set up at the Bankside works. The difficulties which had been met with in the past presented themselves anew. The percentage of the reduction was much less than the experimental data had given reason for anticipating; and explosions took place in consequence of leakage in the cast iron retorts, which cracked, and finally melted during the regeneration of the catalyzer.

The problem was sent back for more thorough investigation in the laboratory, with the object of ascertaining which catalyzer required the lowest temperature for the reaction, compatible with a rate of gas passing on which it would be practicable to work; also, to discover in what form the catalyzer could be best exposed to the action of the gases.

After many trials, it was found that these conditions were fulfilled by the use of balls, 1 inch in diameter impregnated with reduced nickel, obtained by the reduction of the chloride in a current of hydrogen. The most important advance was in discarding the attempt to obtain the temperature of reaction by applying the heat to the outside of the retort containing the catalyzer, and substituting an arrangement in which the gas was previously heated up to 100° C. below the temperature of the reaction, before coming in contact with the catalyzer. This allows of keeping the retort at the practicable temperature of 500° C. The installation was kept at work for 4 months; and during this time, 3½ million cubic feet of gas were treated; the sulphur being reduced from 88.4 to 27.5 grammes per cubic meter (35.3 cubic feet).

As a result of this trial, plans were prepared for a plant for purifying 2 million cubic feet of gas per day. This installation consists of 40 reaction tubes, 14 feet 6 inches in length and 6 inches in diameter, through which the gas passes in 6 streams. The preheating is done by 230 tubes 12 inches in diameter and 20 feet 6 inches in length. The plant was started in November, 1911; but, contrary to expectation, it was found that it was capable of treating but 1½ million cubic feet per day, in consequence of the relatively low temperature of the preheated gas. This was remedied, to some extent, by adding regenerators; and the installation was again started. It was found, however, there was still room for improvement, and it was decided to introduce a new design.

The installation is still at work and does not seem to have at all deteriorated. That the catalyzer is still as active as at first, is seen from the following table:

| Period. | Quantity of Gas Treated, Cubic Meters. | Average Sulphur in the Gas. Grammes per 100 Cubic Meters. Inlet. | Outlet. | Average Reduction of Sulphur. Per Cent. |
|---|---|---|---|---|
| 1..... | 674,474 | 76.75 | 24.14 | 68 5 |
| 2..... | 892,214 | 73.76 | 19.78 | 73.1 |
| 3..... | 680,757 | 75.11 | 19.42 | 74.1 |
| 4..... | 1,031,761 | 52.30 | 17.69 | 66.2 |
| 5..... | 1,114,765 | 69.02 | 20.38 | 70.4 |
| 6..... | 1,023,526 | 73.97 | 19.23 | 74.0 |
| 7..... | 948,644 | 72.43 | 17.22 | 76.2 |
| 8..... | 1,024,319 | 84.13 | 19.14 | 77.2 |
| 9..... | 1,076,617 | 86.29 | 17.00 | 78.8 |
| | 8,464,077 | 73.08 | 19.32 | 73.5 |

Since its erection, 300 million cubic feet of gas have been treated. The cost, not including the secondary purification from hydrogen, is as follows:

| | Cents per 1,000 Cubic Feet. |
|---|---|
| Fuel ..... | 0.296 |
| Manual labor..... | 0.078 |
| Interest, depreciation and repairs 15 per cent..... | 0.336 |
| | 0.710 |

I pass now to a description of our largest installation, with which we have treated the whole production of the Old Kent Road works of the South Metropolitan Gas Company since January of this year. This installation is capable of decomposing the bisulphide of carbon in 10 million cubic feet of gas per day. It is shown in section in the cuts.

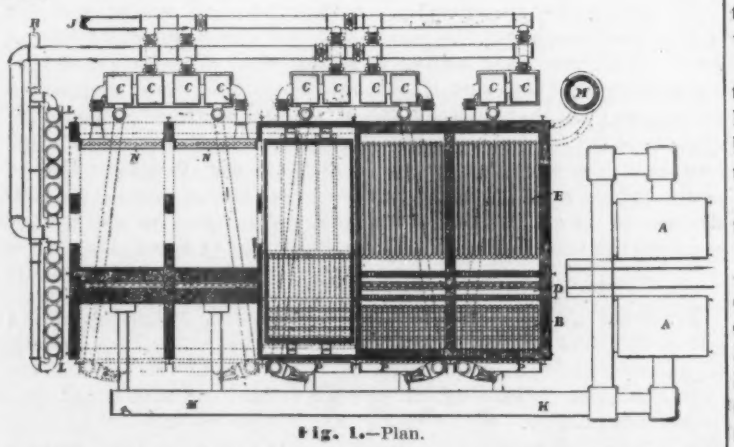

Fig. 1.—Plan.

*A.*—Furnace. *B.*—Retorts containing the catalyzer. *C.*—Heat changes. *D.*—Combustion chamber. *E.*—Preheaters for gas. *H.*—Gas after catalytic treatment *J.*—Gas before treatment. *K.*—Producer Gas. *L.*—Refrigerator. *M.*—Stack. *N.*—Inlets to the Preheaters. *P.*—Outlets from the heat changers.

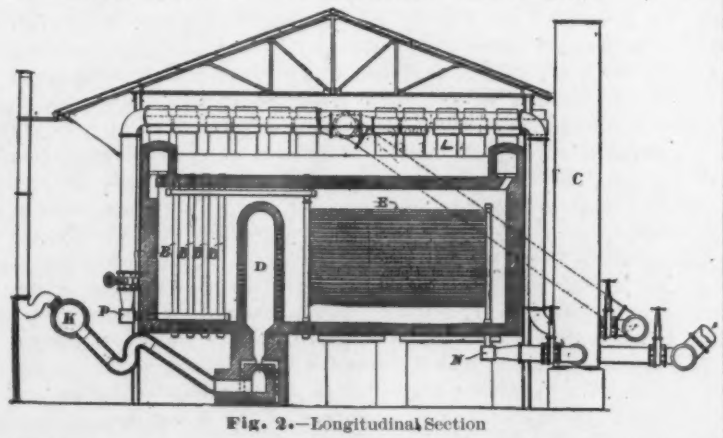

Fig. 2.—Longitudinal Section

For convenience it is divided into 5 units, heated by an exterior gas producer, so the temperatures can be easily regulated. The arrangement provides for putting one unit out of use, for the regeneration of the catalyzing material during the maximum production of gas. The combustion chambers are placed between the retorts or reaction tubes, and the preheating tubes; and the current of the products of combustion from the heating gas can be regulated in one direction or the other. In practice, it is found necessary to regulate only in the direction of the preheater. It may be considered that the part played by the furnace consists in the raising of the temperature of the gas to the additional heat necessary for the reaction, and in preventing any fall of temperature from radiation during the passage of the gas through the catalyzer.

The direction of the gaseous stream is first through a couple of cross current generators, then to a preheating system, and to the reaction tubes; from which it returns to the compensators or regenerators, where it gives up the greater part of its heat to the inflowing gases. By improvement made in the preheating of the gas, its temperature is kept at 410° C. before entering the catalyzer, and as a result, the temperature of this latter is reduced from 500° to 430° C. No difficulty has been experienced with the installation, it requires very little supervision, and that only of the kind customary in gas works.

The following table shows the yield from this installation:

| | Sulphur in the Gas before Treatment. Grammes per 100 Cubic Meters. | Sulphur in the Gas after Treatment. Grammes per 100 Cubic Meters | Sulphur in the Gas after Treatment. Grains per 100 Cubic Feet. |
|---|---|---|---|
| Maximum ..... | 141.1 | 19.9 | 8.7 |
| Minimum ..... | 36.6 | 13.3 | 5.8 |
| Average for the entire period. | 92.2 | 17.8 | 7.8 |

equal to 80.7 per cent. reduction.

Since starting the installation, about 650 million cubic feet of gas have been treated (up to April 21, 1913). The quantity of carbon bisulphide decomposed during this time corresponds to 30,000 pounds of sulphur, or 93,000 pounds of sulphuric acid.

As a whole, the installation is yet imperfect. The heat losses are still considerable, and the cost of installation was too great. But we see means for remedying these defects, and improvement will be introduced into the plans for the installation at the East Greenwich works of the Company.

Tests have been made for nickel carbonyl, by leading the gas after treatment through a heated combustion tube; but no deposit of nickel has been obtained. Scientific investigators show that nickel carbonyl is decomposed completely at 200° C.; but we pass the gas into the catalyzer only when the temperature of the latter is above 300° C.

The reaction by laboratory experiments, is according to the equation:

$$CS_2 + 2H_2 = 2H_2S + C.$$

When pure materials are employed, the carbon deposited on the catalyzer is in proportion to the quantity of carbon bisulphide decomposed. It is this carbon which reduces the activity of the catalyzer by keeping it from contact with the gas. Each unit is worked 30 days before burning off the deposited carbon. This process requires careful manipulation, and is spread over a period of 4 to 5 days, so as to maintain the temperature below the limits at which it would be prejudicial to the metal of the reaction tubes. It is completed when the escaping gases are free from carbonic acid. Reckoning upon the volume of carbonic acid evolved, the quantity of deposited carbon has been found in some cases to be 50 per cent. in excess of the calculated quantity. The decomposition of hydrocarbons may cause this, but it is negligible. This is shown by the following tests, made before and after treatment of the gas:

| Gas before Treatment. | Gas after Treatment. | |
|---|---|---|
| 14.05 | 14.05 | Candle power. |
| 5.90 | 5.94 | B. T. U. |
| 1.82 | 1.80 | $CO_2$ per cent. |
| 3.61 | 3.79 | $C_n H_m$ " |
| 0.27 | 0.07 | $O_2$ " |
| 8.85 | 8.62 | CO " |
| 26.62 | 27.45 | $CH_4$ " |
| 52.45 | 52.19 | $H_2$ " |
| 6.38 | 6.08 | $N_2$ (by difference). |

In the preceding description I have described the success which we have attained; but is the solution worth the cost? My answer is emphatically here expressed in the affirmative. Flame was for the Greeks the emblem of purity; and I believe that the day is not far distant when its value for hygienic illumination will be universally recognized. But the flame itself must be pure, or contain a negligible quantity of impurities. We are near the time when the products of combuetion of gas will not be different from that other form of combustion which we call restoration, while they offer the advantage of possessing immense sterilizing properties, owing to the temperature, which is 800° C. as compared with 35° C. Gas will thus become the ideal source of light at night, as is the sun by day.

[Continued from Page 43.]

## PROCEEDINGS, TWELFTH MEETING, WISCONSIN GAS ASSOCIATION.

Held in Milwaukee, Wis., May 14 and 15.

First Day—Morning Session.

The Secretary announced that Messrs. F. E. Curtis (Chairman), Geo. F. Goodnow and E. G. Pratt, had been named as the

Committee on President's Address.

The President introduced Mr. H. W. Easterly (Fond du Lac), who read the following paper on

### EFFICIENCY IN THE ADVERTISING AND NEW BUSINESS DEPARTMENT.

When our worthy President asked me to give an analysis of Mr. E. St. Elmo Lewis' address on "Efficiency in the Advertising and New Business Department," I had never heard of Mr. Lewis, or his address. However, I am very glad he called my attention to it, for I have found that the suggestions offered are very valuable. We all realize that this is the age of efficiency in all branches of business, and when Mr. Lewis said that we must learn how, when and where to advertise, he gave us something to think about. Mr. Lewis also said:

"Failure to get efficiency in any department lies entirely with the managers of the business. The average gas company has entirely too little business-getting organization, and if it has the organization it is not scientific. There must be science shown in selling and advertising.

"You never saw an efficient new business department that was not buttressed, supported and surrounded by an efficient organization in all other departments as well. It is well for us to remember that no organization is any better than the man who runs it. We know organization is reducible to some one man, from whom the force, power, impulse, enthusiasm and the dominant ideas of the organization come. He is the dynamo of that organization. Therefore, all organization is reducible to the human factors in it. Organization is but a means to the end that we may mould all the human factors of the business, so that it shall obtain, at the least cost, the greatest results from the expenditure of men, time, thought and money.

"We must bring human nature back into corporate management. It has been said many times that corporations are soulless; but nobody ever made that true. It sounds good, and sounding phrases often rule the unthinking.

"We must put soul into corporations and that is the primary work of the new business department. One of the greatest achievements of the new business department to-day is the fact that it is humanizing the corporation. When you get the men right, from messenger to general manager, you get efficiency. Your men must work for the gas company, which in turn, must work for the people, or you are inefficient and wasteful. Efficiency of the advertising department is nothing but a reflection of the efficiency of the organization as a whole. The successful ad writer should always let the person who buys the goods write the ad, because that is efficiency in advertising copy. It is not what you or I think about copy; it is what the customer thinks about the goods that makes the copy. * * * We should look on advertising as a missionary going out to create a state of mind willing to be shown. * * * The more the creative attitude gets into the advertising the easier it will be for the salesman to sell the goods. Advertising does not grow into a business; it grows out of it. That is a very important point to consider, because at the time, and for years past, we find a thousand schemes suggested to us for advertising in our own locality, which are supposed to be applicable to gas companies anywhere. As a matter of fact there is only one efficient way to advertise, and that is by letting local conditions govern. The problem has been the same everywhere, and that is how to advertise in order to meet the social business and distribution problem of the territory, and that comes only through personal and intimate contact with people in that territory." Poor advertising does not pay; it is money thrown away. The human eye is like the film of a camera. The moment it is exposed to an object, an impression is made on the mind. Catchy advertising naturally attracts the eye and the moment it is thus attracted an impression is made. If the impression is good we have practically made a sale. If bad, it will be difficult to overcome in the future. We must make our advertising create a favorable impression and a desire to own the article advertised. Tell in your ad the specific virtue of your article. That is the selling point. Instead of using the old maxim, "It pays to advertise," we should say, "It pays to advertise well."

It is just as necessary to be efficient in salesmanship as it is in advertising. Many sales are lost because salesmen are not efficient. "No matter how large your corporation, it serves a larger corporation—the people, unlimited. It must be polite, genial, careful and smiling. It must live on good terms with that larger corporation, with a penalty that involves its very right to live at all. The same is demanded of the salesman. He must be polite, smiling and willing to serve the people."

Many men are born salesmen, others must be trained. About the first thing you should do, as a salesman, is to find out who your prospective buyer is, what he is interested in, and whether there is anything about your goods and the work of the man, which can be brought together to form a contact. You must get the contact before you get the spark. If you find out what people need before you give good fellowship, good argument, and suggestion, you will have no trouble in getting the point of contact.

The scientific salesman is industrious. When he is not selling he is thinking. He constitutes himself a standing committee on ways and means to devise new plans and execute new schemes to promote his business. He keeps in close touch with his superior officers and establishes a closer bond of friendship between his customers and the corporation he represents. No doubt the best thing that ever happened to the gas business was the introduction of electricity. Electricity was a thing for gas men to fight, and it, therefore, introduced hard thinking into the problem of giving service to the community.

Gas is no longer considered a luxury, or simply a convenience. It is a necessity and should be easy to sell, but the problem of selling gas is no different than selling anything else. Twenty years ago, gas men thought they sold all the gas the public could use, just as we do now; but they then did not, and we do not now. We are beginning to realize that we can and will do bigger things in the gas business. The more things we have to do to-day, that last year we swore nobody would ever do, the sooner we shall realize all the possibilities of the gas business. We are never going to be satisfied because we are never going to realize all that can be done.

*Discussion.*

Mr. Gregg—With us to day is Mr. William F. O'Donnell, of the advertising department, United Gas Improvement Company. Being at Atlanta, when we were there, he heard the Lewis paper. One cannot imagine by reading Mr. Lewis's article, the enthusiasm that he put into his talk. When many gas men get on their chairs, and throw their hats in the air at the completion of an address, it must be a good one.

Mr. O'Donnell—I did not come here with any idea that I was to be asked to talk on any other subject than that of "National Advertising," as to which I want to say something before the meeting is over. Were I to give my views on advertising it would take up a great deal of time; for it is a subject that has to be considered in relation to each local situation to get much good out of it. Advertising is simply printed salesmanship, and it has to be made to tie up with the work of the salesman. Mr. Lewis brought out many excellent points; but the thing that appealed to me most was when he said that the consumer must write the advertisement; that you must not print in the newspapers or in your folders or circular-letters that which looks good to the officers or the commercial agent or the new business manager of your company. You must get the views of the people who buy the goods. Very often a line of argument, or a bit of grammar, or some phrase or word, harshly criticized in the gas company's office, is the very thing which makes the most telling appeal to the consumer. We have done a good deal in Philadelphia during the last year in the way of sending members of the advertising department to talk to consumers. We find that every time a man goes on one of these trips he comes back enthusiastic, and turns out copy that has more punch and more selling argument than copy written in the seclusion of the office. About the only new thing in advertising is to illustrate newspaper advertisements. It cannot be disputed that, if you pay for space in the newspapers, it should be made at least as attractive as the advertising of others using such columns, whether competitors or not; and the best way to make it attractive is to illustrate it. Gas companies have been doing a great deal of illustrating in their newspaper copy, but it has been done largely with cuts supplied by the manufacturers, merely showing appliances. The public

are not interested in looking at such pictures, which are cold and uninteresting. In fact, they show nothing to arouse the interest of the newspaper reader. We have gotten away from that, and are picturing ideas rather than appliances. Our illustrations show figures; and when one looks at the figure of a woman or child, or whatever it may happen to be, you do not at once associate it with gas or gas appliances. You see something interesting. Even the heading used with that illustration does not give away our idea. We take it that the woman, whose eyes rest on that advertisement, is not primarily interested in what the gas company has to say. We have to arouse her interest. So, for instance, we take an illustration of an old lady drawing hot water at the kitchen sink, but we do not show a water heater. We run a heading reading, "When grandmother is convinced." Then they want to know what grandmother is doing there, as to what she was convinced about, and why she was convinced. The copy which follows states you can bank on grandmother's opinion when it comes to doing things in the kitchen; and grandmother knows that the gas water heater is the only proper way of obtaining hot water; and then we follow with proper descriptive copy. This is the only kind of newspaper advertising we propose to get out this year, and it remains to be seen how much it will increase sales. Checking up advertising with sales is, I think, impossible. On sending out advertisements by mail, even post cards to be signed and returned, the number you get back is not much of an index of the value of the advertising, because people find it easier to 'phone in a call for a salesman than to put a stamp on a card and return it. Many people who step into the office to look at appliances, and request that a salesman be sent to them, undoubtedly have had their interest excited by reading this advertising sent them through the mails. We made serious efforts to check up returns, and the nearest we can get to it is to say that the more we advertise the more the business increases, which we think is sufficient proof.

The President—A point I would like to see brought out is this: We use many different mediums and advertise in newspapers, with stickers on gas bills, with postal cards, etc.; but where is the best place to put our money? How do these things size up? Which is the best medium of advertising? What is the best way to reach our consumers?

Mr. Kelsey—To elucidate this problem for myself I analyzed the elements entering into it, taking the whole sales problem from its inception. The general manager of a gas company, could possibly stop everyone he wishes to sell, and try to interest; but being paid to do more vital things, he delegates that to another and appoints a new business manager, finds his field growing, he calls in other men, and these men under him reach the prospective customers through solicitation, by mail, and in other ways. Then the new business manager takes advantage of the modern newspaper with its facilities for getting his message to the people, and caters to people's love of color. If you have 300 or 3,000 prospects, printed matter direct-by-mail must be considered. If there are less than 300, you can try personal interviews and correspondence. When the field grows and practically every customer is a prospect, say where gas water heaters present a virgin field, it is logical to use the newspapers, or street car cards or the billboards. In that case you have the mass of people as your prospects, and it is best to use the medium that blankets your field most easily. There has probably been more money wasted in advertising in the gas field than in any other. Many of you have been kicked into advertising. You used newspaper space because you wanted to placate the editors, and found you got the public ear, with results not otherwise obtainable. The precedents established in the retail merchandizing field at the expense of millions of dollars you could not use first hand; but you now realize they are valuable to you. Mr. O'Donnell said it was almost impossible to get a line on returns. That is true, under present conditions; but I think his books will show data convincing to him and to his associates in directing future campaigns. These returns have been rather disappointing at times; but within the next few years I believe methods will be worked out whereby gas companies will be able to determine the efficiency of this or that medium, whether it is a piece of mailing matter, or a particular newspaper. Let me cite the result obtained by the Milwaukee Gas Light Company, when the paper cooking-bag craze was at its height. We inserted in the newspapers a coupon, which made it possible for a woman to get a 25 cent package of cooking bags for 15 cents. At the end of, say 30 days, we had some convincing data on the comparative pulling power of Milwaukee newspapers for a proposition of that kind. They brought within that time, perhaps 1,000 women to our salesroom, and although it did not bring us any immediate money returns it was the means of bringing many to our salesroom. Suppose a committee of the National Commercial Gas Association was appointed to investigate the relative values of different mediums of advertising, and it was possible for this-and-that company to tabulate returns on any particular campaign, and suppose this data kept accumulating for half-a-dozen years, and was then referred to this committee as a clearing house. Difficult as the problem now appears, it is capable of ultimate solution, and before many years it *will* be solved. The one who writes good copy for a gas company, may not be the best one to handle that proposition. The composer is not necessarily a "system man," for his mind may run on a different tangent; but if you bring the system man to the poposition, he will help elucidate it. The larger organizations are naturally the vital factors in working out any such system, and results will surely come.

Mr. O'Donnell—I did not mean to say it was impossible to check up advertising. What I meant to convey was that it was impossible to determine the maximum value of it. To some extent, of course, we can check. For instance, we found on making an analysis of direct-by-mail advertising, that, in a certain campaign, out of 1,000 letters sent out, we got back 2 per cent.; but that is not the maximum value from that advertising, because undoubtedly a great many people did not use the post cards, but their request came in just the same. It is the same with newspaper advertising. At times it is possible to tell exactly the value of an advertisment. Our big Market street salesroom was opened one Monday. The public had no way of knowing the store would open that day, excepting through the newspapers, and, by actual count, 10,000 came to the store on that day, which was abundant proof of the value of the full page advertisement. Recently we started an automatic water heater campaign in Philadelphia, and used a half page announcement in the papers. On the first day it was run, the telephones were kept so hot with inquiries that it was almost impossible that day to do any other business over the telephone. We can always get indications sufficient to determine whether we ought to go on with our advertising, but we can never tell its ultimate value.

Mr. Haseltine—We have a one man proposition in the Ripon electric and gas plant. We advertise by circulars, letters and newspapers. Our people are interested in a different part of the paper which attracts attention in the larger cities. The local newspaper, in a very small place, is made up of personals and small reading items. I read that part of the paper first, as do the majority of people in Ripon. We found the most valuable newspaper advertising to us was in personal items. Accordingly we put in an item referring to every electric or gas appliance sold. That is, of course, impracticable in large communities, but people in small towns notice these individual items and mention them to their neighbors.

The President—I wish the members would realize these matters primarily pertain to the small plant. The big fellows can take care of themselves; being big enough, old enough and knowing enough, so let those of the smaller plants state their experience. Therein lies the greatest value of these meetings.

Mr. Butterworth—I have always noted instruction and information from the big plants, to the extent that I have time and opportunity to so notice. I was against a pretty strenuous proposition a couple of years ago. In a bankrupt plant, I had to get the business. So I sent my son, he is a member of the National Commercial Gas Association, to towns near by, to learn what could be done. We got much assistance thereby. I followed their instructions, and analyzed the matter from our view point. We got much very valuable information, of course, eliminating what in our judgment was not applicable to our situation. Realizing the importance of a thorough knowledge of surroundings and the attitude of the people generally we adopted a card system used in Beloit which fitted our situation well. We sent an agent to find out who owned each property, the name of the tenant, and the name of the housekeeper as well. By housekeeper I mean the person who ran the stove and so would be apt to buy appliances, and be interested in lighting. On 4½ miles of main we gathered over 580 live prospects. We sent them the kind of advertising we thought would appeal to them, and visited them, but not often enough to cause annoyance. We cultivated their acquaintance and catered to their wants. The greater part of our work was to educate them in the use of gas. That season we put on 150 new meters. We have continued that policy and any time we get any encouragement we take cards and follow up our prospects. I do not permit the man who goes out with the card to write on it. He makes a report and I transfer it to the card, which keeps me in touch with

the field. Finding it was getting away from me, I make it my duty now to do the card work personally. I know the plan of every building that is constructed, and I can tell just how much it will cost to pipe it. Of course, I go to the owner and give him what information I can in a tactful manner, so as to get him with me. I feel that, for country fellows, the right style of advertising is this proposed campaign of magazine advertising. Everything with which I have to compete I can find in some magazine. You cannot often pick up a magazine that does not tell you about some electric appliance, but only occasionally will you find a gas stove advertisement. Presenting systematically, in attractive form, general advertising in magazines of national circulation will educate the people and secure results.

Mr. Stroebel—I have gotten much information from Mr. Butterworth's talk, and it will certainly appeal to others operating in smaller cities. We tried newspapers, billboards, postal cards and many other ways, and we have had results from all. One asset that helps us more than anything else is a satisfied customer. A lady in our city sold 8 cabinet ranges for us. She will not take any pay for this work, being satisfied with the popularity she gains among her neighbors by placing before them a superior gas range. The small plants, where Milwaukee papers are read, are indebted to the Milwaukee Gas Light Company. I know the advertisements that the Milwaukee Gas Light Company publish have sold quite a few appliances for us.

Mr. Butterworth—I desire to indorse what Mr. Stroebel said about the advertising of the Milwaukee Gas Light Company. It certainly has helped us get on the map. With respect to the list of follow-ups that I have, I make it a practice to send them something at least once a month, if only a circular or general letter, and I try to get the viewpoint of the consumer. For instance: Last September and October I discussed arc lights; this year, heaters and flatirons. Get the viewpoint of the customer and you get his order. Induce your customers to call at your office if you can; keep after them. Post yourself on whom to see; then see them. We do some local newspaper advertising, and I am frank to confess that I do not do it for the direct result, but the indirect results are excellent. The goodwill of the local newspaper man is invaluable. His influence is wholesome, and the advertising is of great indirect value. I do not mean to say that I was sandbagged into it. I feel under obligation to do it, and it is only right that we should give newspapers a fair share of our advertising. Nor do I think the newspapers would choke me if I did not advertise.

A unanimous vote of thanks was then passed to Mr. Easterly for his excellent paper.

The President—On reassembling at 2:30 we will have the pleasure of listening to Mr. Halford Erickson, of the Railroad Commission of Wisconsin, and I hope all will be prompt in attending.

A recess to 2:30 P.M. was here ordered.

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FIRST DAY—AFTERNOON SESSION.

The President announced the appointment of Messrs. J. E. Patten, Robert Young and B. F. Lyons as a

COMMITTEE ON NOMINATIONS,

and then introduced Mr. Halford Erickson (Wisconsin Railroad Commission), who read the following on the subject of

## IMPORTANCE OF UNIFORM ACCOUNTS AND STATISTICS.[1]

In his work on accounts, Mr. W. M. Cole defines accounting as follows:

"Accounting is a scientific analyses and record of business transactions. It attempts to tell, about every transaction, everything that can be of service. It attempts to show the result of every effort, the cost of every return. Only by its aid can satisfactory comparisons be made of different enterprises and different methods."

This definition indicates that accounting is concerned with how wealth is produced, as well as with how it is distributed among the producers. It also suggests that accounting is based on economic principles, and that it deals with the relations that obtain between existing industrial factors, as well as with business transactions. The relation between economics and accounting is, in fact, quite close. Economics treats of the theories of production and distribution of wealth. It describes and analyzes the various processes and conditions connected therewith. Accounting can be so applied as to disclose how much each factor in production contributes to the total product and how much it receives in return for this contribution. It can also be made to reveal whether there are any inequalities between the respective contributions of land, labor and capital, and their respective rewards, therefor, in the form of rent, wages and interest. While accounts can be made to disclose many economic facts, their real purpose is usually to furnish necessary information about the business whose transactions they contain. Economic data is of value to the economist and to society as a whole; but, to individual business men, they are not as important as facts which show the details of their business. It is undoubtedly true that the accounts might be so kept as to show the contributions and the rewards of the various factors of production, as well as all the necessary details of the business they represent; but few accounts are so organized. The accountant is seldom enough of an economist to bring out such facts. These facts, even if obtained, would also be of little value in the business, and to properly obtain them would, in most cases, add something to the work involved in classifying and recording the facts. Up to the present time there has been little or no demand for accounting classifications based on strictly economic principles. While few, if any, efforts have been made to organize accounts with this end in view, it is nevertheless a fact that, under many systems now in use, it is possible, through slight readjustment of the main facts, to obtain information that throws a great deal of light upon economic relations. We are here concerned with accounts in which the items are so classified as to disclose the results for particular business enterprises, rather than with accounts so made up as to present general economic facts. Managers of business enterprises are chiefly interested in specific facts showing the results of their transactions, and which will aid them in bringing about economies in operations. To that end it is not only necessary that the transactions should be properly classified, but that these classifications should be the same as those adopted by others in the same industry. In the public utility field, for instance, it is a distinct advantage, from every point of view, to have as many plants as possible adopt the same classification for their accounts and records. Such classifications are adopted by the larger holding companies, and others who require regular reports from their various plants, and they largely manage these plants through the facts given in these reports. They are recommended by technical organizations, gas, electrical and other associations, and are urged and adopted for various purposes by the National government and by many State governments. Many of the latter States require that public utilities adopt uniform classifications of accounts. A proper system is one in which the various items are classified, according to their kind, nature and purpose to be attained, and so kept that the results for each plant, as well as for all the plants, may be compared from year to year. It is one that is elastic enough to meet the conditions of operation for small as well as large plants, and that can be adapted to variations in organization and methods of production, to the end of revealing the weak as well as the strong points in the situation. It must be practical and one under which dependable results can be promptly obtained. Uniformity is necessary for proper comparisons, and analyses of the kind that disclose inefficiency, waste and bad practices generally, and that suggest improved methods of production and operations, or under which the business as a whole may be properly disciplined. That the system must be elastic to be generally used is clear, when we consider the variety of conditions under which utilities are operated. Small plants cannot very well supply as many details as larger ones. There are also some differences between privately and municipally owned plants. Some gas plants produce coal gas, others water gas; and some purchase their entire output. Where two or more utilities are jointly operated, complications in accounting are also met with. These illustrations show quite clearly that the system adopted should be flexible.

The main purpose of uniform classifications is thus to secure such information concerning the earnings and expenses of the plants, the investment therein, the conditions under which they are operating, and other facts of this nature as will assist the managers in their work, disclose to the investors the conditions of the property, and render such aid to the public service commissions that they may be in position to deal intelligently with the many problems that come before them. To this end it is necessary that the investment, the earnings, the operating expenses and other outlays be correctly shown in the aggregate; that the various items which make these aggregates be classified as to their nature and their relation to each other; that these classes, in turn, be grouped by branches of service and by successive steps in the production and furnishing of the service, and that

1. Slightly abridged.—EDS.

they can be reduced to costs per unit. By comparisons, and in other ways, such facts disclose existing conditions and promote greater efficiencies of operation. They may also be of assistance in making and adjusting rates and other particulars. In making these classifications and groupings, it is necessary to adhere to principles of accounting that are recognized as sound and that have been so found in practice. In other words, the classifications must be such that the balance sheet accounts can be properly closed into the balance sheet; and that the earnings, the operating expenses and other outlays can be closed into an income account to show the net earnings, finally going into some account, such as a loss and gain account, showing disposition of the net earnings. The uniform systems adopted by the Wisconsin Commission were as closely adjusted to the conditions to which they were to be applied, as was thought practicable at the time. The gross revenues from all sources are classified as to their nature and by branches of the service. Such classifications are easily made on the books of the utility. Without much extra work these classifications can be considerably extended. Thus, the operating revenues could readily be separated for the minor classes of service, as well as in accordance with the form of the rate schedule or bill. The revenues should be given in the gross, without any reduction for overcharges, commissions and other similar deductions. The operating expense of a utility includes all items of expense incurred in being prepared to serve (and in serving) the public. It covers the cost of producing and distributing such services, together with the commercial, general and undistributed expenses involved in this service. It also includes depreciation and taxes, although these are classed separately. From one point of view, the cost of the service includes not only the items given, but may also be said to include interest or profit on the investment. The operating expenses proper consist largely of labor, material and ordinary maintenance or repairs. They are on the whole more difficult to properly classify than are the earnings. The production or furnishing of service by most public utilities does not differ greatly from the ordinary manufacturing processes in other lines of industry. In manufacturing there are certain well defined steps through which the material must be carried before it is finally delivered to the consumers as a finished product. In the case of a gas utility there is a sim ilar development from raw material to gas. In water, electric and telephone utilities there are similar processes in the conversion of elements into serviceable forms, and in delivering them where they are used. In manufacturing, as well as in utility service, there are distinct steps in the progression from raw material or from the elements to the point where the commodity and service are delivered. Each of these steps is well defined and involves expenses which are peculiar thereto, and it is important that the expenses for each of these steps or departments should be shown separately. Such grouping of the accounts has, therefore, been provided in the Wisconsin classification. Separate accounts are also provided for such fixed charges as inte rest and profits. The number of the accounts used in each group depends on the methods of production, the size of the plant and on general conditions.

When the gross revenues and the operating expenses, including taxes and depreciation, are correctly stated, the balance between them constitutes the *net* earnings of the plant; or the amount left for interest and profit on the investment. The operating expenses were incurred in order that the revenues might be obtained, the latter in a sense depending on the former. In comparing the two sums, for the purpose of obtaining the net earnings, all the earnings which were not obtained from the expenditures in question, and all expenditures made for other purposes than the earnings obtained, should be excluded. The accounts which show the investment in the plant, are classified on principles, similar to those which have been outlined for the earnings and the operating expenses. The amounts paid for rights or permits to do business are given in separate accounts. The costs of land are classified according to the uses to which the land is put; also, the cost of buildings, equipment and other property. The overhead expenses are classified according to their nature or kind, and this applies to all balance sheet accounts. One purpose of these classification items is to show in detail the cost of the plant, and how the capital was obtained, or what the plant owns and what it owes. Another purpose is to present these facts in such a way that they may be fairly apportioned between the different branches, departments, and classes of the service, as a basis for the capital charges that should be borne by each of these branches. But the accounts alone, even when classified and presented under the most approved methods, often fail to furnish all the information needed to fully understand the situation for particular plants and groups of plants. In order to form intelligent opinions as to the real situation, it is necessary that the accounts should be supplemented by complete and properly classified operating statistics. It is obvious that for many purposes it is as important to know the quantities of material, supplies, and labor involved, as it is to know the total expense incurred for them. Similarly, statistics showing the amount of gas produced and sold; the quantities of by-products produced and sold; complete consumer and meter data, and many other facts of this nature, are of importance. For these reasons the form for the annual reports to the Commission require as much statistics as purely accounting results. Systems of accounts and statistics, such as those outlined, will disclose an immense amount of useful information. When properly closed and summarized, the property accounts show in detail and in the aggregate the amount actually invested in the plant. Similarly, the revenue accounts will show the total revenue, and the amount contributed thereto by each branch and class of the service. The operating expenses will show the total cost for each department, as well as the aggregate for all the departments. Similarly, the statistics gathered, when classified and collected, furnish all the facts of a statistical nature necessary to support the expense, to judge of their propriety and to disclose operating conditions.

In order that the operating expenses, and the statistical data, may be of the greatest value they should not only cover the plant as a whole, and each departuent thereof, but they must be extended to cover separately each branch of the service. They must show the respective costs and other facts for the commercial, industrial, municipal, power, and all other branches. Such allocations are necessary in order to determine the cost for each branch and whether it is self-sustaining. They are also necessary in order to obtain facts upon which to fix and adjust the rates for each branch.

Business enterprises, especially the larger ones, are largely managed through statistics, and rates in a large measure based on costs. The cost basis of rates is in a sense arranged by law, in providing that public utilities are entitled to rates that will yield reasonable amounts for operating expenses, including depreciation, and interest, and profit, and the fair value of the investment. It appears that, under normal conditions, the allowance for these purposes cannot be less than the amounts which will bring the necessary capital into the field, and cover the cost of keeping up the property, and provide adequate service. Where the cost of the service is a controlling factor in rate making, it becomes necessary for the rate maker to determine the actual, as well as the normal, cost of the service, and whether the normal cost so determined is a reasonable one. The actual cost for each particular plant may be obtained under the uniform system of accounts, and it may be tested by inspection and audits. The actual cost for any 1 year, however, may for some reason be abnormal, and the operating expenses may have been temporarily either over or understated. For instance, repairs may include renewals, or may have been deferred. The proper amount may not have been set aside for depreciation. Interest charges and profit allowances may have been out of line. To determine the normal cost of the service, it may be necessary to analyze the costs for several years, as well as its needs and the conditions under which the plant is operating. The normal cost, as thus determined, may not always be a reasonable cost. A plant may be badly managed or it may be well managed, and have unusually low operating costs, but other costs may be out of line.

Often there are found great variations from year-to-year in the amounts paid for labor, material and supplies, maintenance of the plant, or other factors in operating expenses, which variations are sometimes due to the management, at other times to other causes. Such facts may explain why the expenses for any one year are not normal, as well as why the normal cost may not be reasonable. To determine the reasonable cost, careful comparisons with corresponding facts of other plants, may be of considerable value. Such comparisons are not conclusive, but when carefully made, and considering the capacity of the plants, the length of the distributing system, the demand, the saturation of the territory, the method of developing the business, the continuity of the service, and the methods of production, they cannot fail to throw much light on the situation.

The relative importance of allowances for depreciation, depends upon the nature of the utility with the conditions under which it is operated. A water utility has a very much longer life than that of a telephone utility, and its depreciation is comparatively small. If the rate fixed for depreciation is too small, it will be impossible to keep the plant value up to the proper amount; if it is too large, it

(*Continued on page* 58.)

THE AMERICAN GAS LIGHT JOURNAL INC.

Entered at the Post Office, New York City, as Second-Class Matter.

Published weekly at 42 Pine Street, New York City.

Telephone Call, John, 2996. Cable, Am-Gas.

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NEW YORK, MONDAY, JULY 28, 1913.

[Official Notice.]

## Transportation Arrangements, October Meeting (Richmond, Va.), American Gas Institute.

American Gas Institute,
Office of the Sub-Committee Transportation,
141 Wabash Ave., Chicago, Ill., July 15, 1913.

Special trains to Richmond, Va., will be run from New York, Philadelphia and Cincinnati. The New York train will stop at Newark and Trenton, N. J. The Philadelphia train will stop at Wilmington, Del., Baltimore, Md., and Washington, D. C. The Cincinnati train will be composed of special cars from Cincinnati, Chicago, St. Louis and Detroit-Toledo.

The New York and Philadelphia trains will leave from their respective cities, the morning of Tuesday, October 14th, arriving in Richmond the same afternoon. The Cincinnati train will leave Cincinnati the evening of Monday, October 13th, arriving at Richmond, Tuesday afternoon. Special cars from Chicago, St. Louis and Detroit-Toledo, will be attached to the Cincinnati train and will leave their respective cities Monday morning, October 13th. The Boston contingent will be scheduled out of Boston, Monday evening, October 13th, via Fall River Line, although those preferring to do so can leave that city at midnight by train, and reach New York in ample time to make connections with the New York special Tuesday morning. While the arrival of these special trains at Richmond has been so timed that they will reach that city about one hour apart, for greater convenience in registrations and securing accomodations at the hotels, all the trains will reach Richmond in ample time for dinner that evening.

The New York special train will be in charge of Mr. W. Cullen Morris, Consolidated Gas Company, New York City, N. Y. The Philadelphia special train will be in charge of Mr. J. B. Klumpp, Inspecting Engineer, United Gas Improvement Company, Philadelphia, Pa. The Cincinnati special train will be in charge of Mr. William H. Crutcher, Superintendent, Kentucky Heating Company, Louisville, Ky. The special cars from Chicago will be in charge of Mr. J. M. Moorhead, Chief Chemist, Peoples Gas Light and Coke Company, Chicago. The St. Louis special cars will be in charge of Mr. S. H. Wallace, Assistant General Manager, St. Louis County Gas Company, Webster Grove, Mo. The Boston contingent will be in charge of Mr. N. W. Gifford, General Manager, East Boston Gas Company, Boston, Mass.

The Trunk Line Association, the New England Passenger Association and the Southeastern Passenger Association have authorized reduced rates from points covered by their Association, to Richmond, Va., on the certificate plan.

The itinerary of these "Specials," with full particulars as to fares and Pullman rates, with return postal cards requesting reservations, will be mailed to all members of the American Gas Institute about one month prior to the meeting.

B. J. Kellum,
Chairman, Sub-Committee Transportation.

## DEATH OF ANTHONY N. BRADY.

Mr. Anthony N. Brady, one of the very prominent, active financier-capitalists of the last quarter century, died in the Carlton Hotel, London, England, the evening of July 22d, from an attack of *angina pectoris*. Deceased was well known to the gas profession, from his active connection with many of the largest gas and electric lighting corporations in America. Perhaps most prominent in these were: The Consolidated Gas Company, of New York city; the New York Edison Illuminating Company; the gas and electric lighting interests of Albany and Troy, N. Y.; the Brooklyn Edison Company; the Peoples Gas Light and Coke Company, of Chicago, and so on. At the time of writing (Friday, the 25th) his body is on the White Star steamship "Baltic," *en route* for New York.

## BRIEFLY TOLD.

An Appreciation of "Chief" Bradley.—The *Journal of Gas Lighting* (London), in commenting on the paper on gas holders, read by Herr Körting before the German Association, calls attention to the progressive lowering of cost, per unit of capacity, with the increase in size of holders constructed; and gives credit for this to the engineering ability and discernment, combined with boldness and enterprise, of such engineers as Sir George Livesey and Mr. Wm. H. Bradley. To us this is only one direction in which the "Chief's" initiation has led. Witness in this respect his last enterprise, now nearing a happy completion, the rock tunnel under the East river, from the Casino Beach (Astoria) plant of the Consolidated Gas Company to Morris Point in the Bronx.

National Advertising.—We have received from Mr. Louis Stotz, Secretary of the National Commercial Gas Association, a copy of the prospectus concerning national advertising. The campaign has been launched, a well and favorably known firm of advertising agents selected to handle it, and the magazines and periodicals chosen, in which the matter will appear. If each gas company will contribute its share, as it will undoubtedly receive its proportion of benefit, this engine of education, to popularize gas and its domestic and industrial applications, cannot fail to be a huge success. The general platform is this:

1. To establish a friendly relation between consumers and gas company.
2. To show the consumer how to use gas more intelligently, and more economically.
3. To teach the consumer new uses of gas, that will add to household efficiency, and to business efficiency, and help to lower the cost of living.

Illuminating Engineering Society Notes.—The time selected for the annual convention of the Illuminating Engineering Society (Pittsburgh, Pa., September 22 to 26) would seem very fitting, for at that time the city will be celebrating the 125th anniversary of the formation of Allegheny county, wherefore the "city and suburbs" will be dressed accordingly. Of course, this means that the visitors will be able to see Pittsburgh in its holiday attire and will thus have the opportunity of inspecting many special illuminating features, and at the same time not be subjected to overcrowded hotels, a condition that might fairly be expected were another large convention being held in the city. The Papers' Committee reports pronounced success in inducing a number of authors to come forward with productions on subjects sufficiently up-to-date to compel the interested attention of those concerned in illumination. Although not prepared to now announce the complete programme the Committee advises that these numbers have been promised: "The Use of the Photo-Electrical Cell in Photometry," by Prof. T. R. Richtmeyer, Department of Physics, Cornell University. "Characteristics of Enclosing Glassware," by V. R. Lansingh. "The Quartz Mercury Vapor Lamp and its Applications," by W. A. D. Evans, Cooper-Hewitt Electric Company. "The Fontane Lamp as a Working Standard," by Messrs. E. G. Crittenden and A. H. Taylor, Bureau of Standards, Washington, D.C. "The Nern Tube Lamp," by Mr. George Claude, Boulogne, France. In addition to these Mr. Roscoe Scott, of the Nelite Works, General Electric Company, Cleveland, O., will deliver a lecture on the "Evolution of Illuminants." Coming, as it does, at a time when lighting standards are being changed so rapidly, with a greatly increased use of artificial illumination, this discourse should prove of particular interest in describing progress of the art. The Philadelphia Section intends to present to the presiding officer of the convention an historic gavel. Mr. Robert Ely is Chairman of the gavel committee.

Midsummer Meeting, New Jersey State Gas Association.—Those who journeyed to that famous seaside resort known as Asbury Park, the morning of last Wednesday, to take part in the midsummer session of the New Jersey State Gas Association, were well repaid. The weather was of the real seaside summer sort, the preliminaries had been well attended to, the hospitable attentions of the local gas men were of the nature that compels comfort and ensures enjoyment, and the technical proceedings were of much interest and value. The meeting room was in the spacious Sun Parlor of the Metropolitan Hotel, and three score and fifteen greeted President Butcher, when (at 10:30 A.M.) that alert gentleman sounded the call to order. Routine business having been transacted *pro forma*, the President introduced Mr. A. W. Fowler, who delivered a very interesting de-

monstration lecture on "The Lungmotor." The apparatus responded readily in the work of resuscitation to the manipulation of the demonstrator. Then followed a lecture by Mr. W. H. Metcalfe, on the well-tried, well-known "Pulmotor" device, the value of which has been proved over and again in instances of asphyxiation by gas that had every indication of fatality. Perhaps 2 hours were taken up in these demonstrations; and about 1:30, the delegates were seated around the comfortable tables of Wardell's hostelry at Port-au-Peck, where a bounteous, well-served shore dinner was enjoyed. As one high in authority remarked, after the feasting was at an end, "That surely was some session." Not a thing happened to mar the complete harmony of the gathering, before, during or after; and many pleasing comments were made on the way home as to the 1913 midsummer session of the New Jersey State Gas Association. Here it may not be amiss to record the fact that the especial thanks of the Association were voted to Mr. Deneger, Director of Publicity, Asbury Park Section, New Jersey Public Service Corporation for his hearty and successful attentions; also to the management of the Metropolitan Hotel on like account. On JOURNAL account we wish to acknowledge the nice attention on personal behoof that was extended to us by all, more particularly perhaps to that clever gentleman, Mr. O. F. Potter, who at all times and in all places is up to doing the right thing at the right time.

NEW OFFICE BUILDING FOR THE CAMBRIDGE GAS LIGHT COMPANY.—The formal opening of the magnificent new office building of the Cambridge (Mass.) Gas Light Company, was on the afternoon of Wednesday last. From 2 o'clock until 5, President Albert M. Barnes received the invited guests as they entered, and in turn received from them congratulations upon his elegant surroundings. Superintendent J. P. Kennedy and New Business Manager Wm. L. King, with their assistants, saw that each of the visitors was taken over the whole of the building to inspect its detailed arrangement and equipment. Light refreshments were served on the third floor, where an orchestra of stringed instruments entertained. The guests of the afternoon included officers and representatives from most of the New England gas companies, and some from New York. The building itself is an ornament to Massachusetts avenue, and a fitting companion to the Harvard Trust Company, immediately adjoining.

## CURRENT MENTION.—

MR. R. C. FRAMPTON, President and General Manager of the Pittsburg Water Heater Company, is, of course, a clever gentleman and a good business man; but very few men in his position are broad enough to assume the attitude that has been taken by him in respect of the legal contention between his Company and the Ruud Company in the instance of certain patent rights. However, and not to say too much one way or another, to the end that each may judge for himself, we advise those interested in the subject of gas water-heaters to send to his address (Pittsburg Water Heater Company, Pittsburg, Pa.), for a copy of the "Announcement," signed by him under date of the 12th inst.

THE Indiana State Board of Tax Commissioners, having considered the appeal of the Indiana Gas Light Company that the Board's assessment or valuation ($150,000) of its properties in Tipton and Noblesville was excessive, has lowered the rating to $82,000. And the revised figure would seem sufficiently high.

MR. JAMES GAMBLE, of the Public Utilities Company, 15 William street, New York city, writing under date of the 23d inst., says:

To the Editors, AMERICAN GAS LIGHT JOURNAL: Having had the privilege of business relations with Drakes, Limited, and of being a guest of Mr. J. Armitage Drake, in Halifax, England, last year, allow me to express, through the columns of your JOURNAL, a sincere confirmation of the tribute appearing in your last issue, relative to the sad death of that most estimable gentleman, at an age when he was in the very zenith of his usefulness. Alas! Messrs. Editors, such men as our departed friend are seldom replaced.

THE weekly reports of the output of gas and electric current of the subsidiaries of the American Public Utilities Company, for the week ended the 12th inst., show an increase all along the line, ranging from 5 to 30 per cent. over the corresponding period in 1912. La Crosse, Wis., leads with an increase of 30 per cent. in the output of gas, and 20 per cent. in the electrical current sendout. The Merchants Heat and Light Company (Indianapolis, Ind.) shows an increase of 25 per cent. in the electric current output; Elkhart, Ind., an increase of 18 per cent.; the Utah Gas and Coke Company (Salt Lake City, Utah) a gain of 18 per cent.; and Red Wing, Minn., and Valparaiso, Ind., each report 8 per cent. gains in gas sendout. The subsidiaries of the American Public Utilities Company have placed over 1,200 modern type gas ranges during the months of June and July. Further, the by-products (coke, tar and ammonia) of the gas plants have virtually been disposed of as fast as produced.

THE Winnipeg (Manitoba) Electric Railway Company recently decided to make large additions to its gas plant, and have engaged Messrs. Merrifield & Burnett, Consulting Engineers, 271 East Front street, Toronto, as consulting and supervising engineers, to design and supervise the construction of the proposed extension. These include a new retort house and equipment capable of manufacturing 2,000,000 cubic feet of gas each 24 hours; coal and coke handling plant, including hoppers and electric telpher systems; ammonia plant, etc.

THE Western United Gas and Electric Company will be 8¼ years old the 1st prox., and proposes to celebrate that date by passing the 40,000-mark in meters in service. At the beginning of business, February 1st, 1905, the number of meters totaled 15,900. Gas sales in 1905 were 474,000,000 cubic feet; and for the current year those will exceed 1,100,000,000. The electric income in 1905 was $61,000; this year it will exceed $180,000.

"V. E. B.," writing from New London, Conn., under date of the 22d inst., informs us that on July 1st the following reduced rates for all classes of service became effective: *Gas.*—From 400 cubic feet to 15,000 cubic feet per month. Old rate: $1.35, gross; $1.20, net. New rate: $1.25, gross; $1.15, net. From 15,000 to 20,000 cubic feet per month. Old rate: $1.35, gross; $1.10, net. New rate: $1.25, gross; $1.10, net. From 20,000 cubic feet, upwards, per month. Old rate: $1.35, gross; $1.05, net. From 20,000 cubic feet to 50,000 cubic feet per month. New rate: $1.25, gross; $1.05, net. Above 50,000 cubic feet per month. New rate: $1.25, gross; $1, net. Minimum bill rendered per month, 50 cents.

THE electric lighting schedule (both schedules refer to the New London (Conn.) Gas and Electric Division of the Connecticut Power Company) has been thus amended. Residential lighting: Old rate 13 cents; discount, 1 cent per K.W.H., 10 days; new rate, 12 cents, discount remaining the same. Minimum bill, $12 per year. Commercial lighting: Old rate, 13 cents for the first 100 K.W.H.; all excess, 11 cents; discount, 1 cent per K.W.H., 10 days. New rate: 12 cents for first 50 hours' use of the connected load; all excess, 8 cents. Discount, 1 cent per K.W.H., 10 days. Minimum bill, $3.50 per kilowatt, of connected load per month.

AT a meeting of the Progress Club, the Brooklyn Union Gas Company, a new (rather a varied) set of by-laws was proposed for its government, which are to be acted upon finally at the August meeting of the named body. The scheme is intended (and will undoubtedly so result) to cause the Club to be actively engaged in promoting the technical as well as social welfare of its members. For instance, in respect of the Educational Committee: That section of the body will be charged with the execution of a comprehensive scheme intended to embrace a variety of features in connection with the business. Sub-committees will be formed in every branch, as well as in the offices of the subsidiary Companies, whose members will carry out the general plans of the Educational Committee. In this way it is proposed to not only interest the rank-and-file of the organization, but also enable the heads of the different departments to more readily determine the latent power, only dormant, in that there has been no opportunity for its development. The Brooklyn Union Gas Company is not only the third largest in the United States, but it has a field that is showing wonderful developments continually, wherefore its field will offer many opportunities for ambitious young men in the coming decade. As the transit facilities now underway are gradually nearing completion, the population of the Company's territory will increase with great rapidity, wherefore the young element in the service should not lose the opportunity for self-improvement afforded by affiliation with the Progress Club, provided they are pervaded by the ambition to reap the benefit of that which the Company's future is certain to plenteously provide.

MISS ELSIE G. CARING, of Rochester, N. Y., has just concluded (Saturday last) a most successful series of lectures, at the instance of the Henrico County (Va.) Gas Company, on Domestic Science. The lecturess gave her demonstrations in the Highland Park High School Building, with the aid of a modern gas range, and so successful was she that, commencing Monday, the 21st inst., with a rather slim audience, by the middle of the week there was barely room to accommodate those who desired to witness the demonstrations. Mr. W. H. Matlack, Jr., made himself exceptionally useful during demonstration week.

(*Continued from page 55.*)

amounts to that extent to an additional return upon the property, and the apparent cost of service will be abnormally high. The normal allowance depends upon the life of the utility, also upon the method of computing depreciation. If a plant has a life of 50 years, the straight line method of depreciation calls for a 2 per cent. annual reserve, and with a life of 20 years it would be 5 per cent. When the life of the property and the method of setting aside the depreciation reserve have been determined, the actual computation is largely a matter of mathematics. To establish a normal rate for depreciation, it is important to have an accurate statement of the composite life of the utility, and to know whether a straight line or a sinking fund method is the better adapted to its needs. The amount paid as interest and dividends is not often a safe guide as to what these rates should be, because the amount so paid depends on the capitalization, and the earnings, or the policies of the plant in such matters, rather than on what rate should be allowed. Generally speaking, the reasonable rate is the rate at which the capital needed can be had; or the return that closely approximates the rates that are received upon capital in other undertakings, where the risks and other conditions are similar. In determining the reasonable rate of return it is necessary to consider: The prevailing rates of capital similarly invested; whether the plant is in the experimental stage; the future prospects of the place served; whether it is practicable to charge rates which would yield reasonable returns; the risks involved; the rate at which capital is offered; and other factors of this nature. While all these have a bearing, and together with other factors must be closely investigated, the greatest amount of consideration should be given to the rate and the conditions upon which capital is offered, or can be had. This rate may range all the way from 5 to 9 per cent. or more.

The importance of proper classifications of expenses; of separating them by steps or departments; of testing the reasonableness of the aggregates; comparing them with the figures for the same plant for other years, and with those of other plants, determining the efficiency of operation and of the management, can hardly be overestimated, the effectiveness of such analyses being greatly increased, when these aggregates are reduced to costs per unit. The value of such unit costs is thus aptly stated by the President's Commission on Economy in its report to Congress:

"Economy means conformity to standards or unit measurements of cost. Efficiency is the test which the administrator must apply to individual and organized effort directed toward the accomplishment of result. In order that he may think intelligently about the subject of his responsibility, he must have before him regularly statements which will reflect results in terms of quality and quantity, and he must be able to measure quality and quantity of results by units of cost and units of efficiency."

It should be noted that the emphasis in this definition is placed upon standard units of cost. Efficiency of management can be judged by an inspection of certain elements of the income account. Among these the expenses for materials, salaries and wages are important. Have extravagant salaries been paid, and is the payroll abnormally high for the amount of work accomplished? Do the expenses for advertising and promotion of business appear unwise? What are the unit prices paid for materials, including fuel? If the company has by-products, has it derived a proper amount of revenue from them? Has maximum efficiency been obtained in steam generation? Has the management allowed its equipment to deteriorate, or has it kept it up by adequate repairs and renewals?

These questions suggest a few of the points that must be considered. To make the most satisfactory study of efficiency, these different costs must be expressed in terms of standard units, and, by comparing similar units in different plants, we can often get a good idea as to what costs should be. If the accounts have been classified by successive departments, it is feasible to determine the relative efficiency in each step, and the expenses per unit in each branch.

Efficiency of management is also determined to a very large extent from statistics and operating data. In a gas utility, factors that disclose efficiency in management are: Saturation of territory, amount of gas sales in relation to gas produced, gas used by the company, gas lost and unaccounted-for, the unit cost of production of gas, the total unit cost of the operating expenses, less residuals, and the unit net earnings of the plant. Conditions that would be shown by studying statistical information are the increase in the number of consumers as related to the increase in population; the number of consumers per 100 population by years; the average annual sales per consumer; the number of consumers per mile of distribution main. That is to say: Has the business been keeping pace with the increase in population, and have new consumers been acquired as rapidly as new main extensions have been laid? By compilations of statistics of companies of the same class "the deadly parallel" can be employed to show up weak spots.

Honesty of officials and employees is requisite to efficiency and economy, and while uniform accounting methods cannot absolutely prevent, they do check dishonesty.

This question of integrity applies to the capitalization. All may see what the capitalization is, and, if valuations have been made by a commission, the amount of excessive capitalization, if any. Then, too, by these uniform accounts, the investor can know whether property has been maintained by adequate repairs and depreciation reserves, or whether capital has been impaired by unwarranted dividends.

One of the principal purpose of costs' finding is to promote efficiency. It is not enough to know what costs are; we must know where and how to reduce them. Costs are a means to a certain definite end, and the most important function of obtaining such costs is to aid in securing the better management, greater efficiency, and a reduction in the cost of the service. Another form of separation of expenses, which is fundamental in the preparation of a scientific rate schedule, is apportionment over output, capacity and consumer expenses. Enough has been heard about these costs, so that a few brief definitions will suffice to bring out their characteristics. "Output" expenses are, first of all, variable quantities. They depend upon the output, and vary with the volume or extent of service rendered. "Capacity" expenses, are fixed expenses, and depend upon the capacity and demand for service; and the greater part of them go on, whether any service is sold or not. "Consumer" expenses are those which depend upon the number of consumers, and vary therewith. The importance of the three classes of expenses just mentioned, and a correct allocation of the expenses between them, is not generally recognized, and comparatively few attempts to separate, or classify, expenses on this basis appear to have been made by the companies themselves. This is much to be regretted, for there is greater need in rate making for such separations, and for sound information upon the nature and importance of these expenses, than upon any other feature of the operation and management of public utilities. Careful thought upon the subject leads to the conclusion that accounting classifications should be so made to facilitate such seperation of the expenses between output, capacity and consumer costs, as those mentioned. In the classification of the Wisconsin Commission, some attempts were made to so adjust the classifications, but these efforts were not carried far enough. One reason was that the groupings came in conflict with existing practices to such an extent as to impair uniformity if carried out. It was also found that the relations of these expenses to each other were so much affected, by changes in conditions of operation, that it was not thought safe to attempt to lay down specific rules for their separation until more experience has been had in these matters.

It is hoped that utilities may soon be in position to make these classifications, as they would be of the greatest value to the commissions and the public. It would place them in position to formulate proper rate schedules, and to justify the same before the public.

In operating joint companies, when accounts are properly kept, a complete separation of the investment can, as a rule, be had from the books and records of the company. When these records are incomplete it may even be necessary to make a detailed appraisal before the necessary allocations can be secured. The direct earnings from such utility can easily be separated. The miscellaneous or indirect earnings may be the result of joint operation, and in such cases may have to be arbitrarily apportioned. When the utilities are owned by the municipality it should be insisted that earnings be kept as separate as if they were owned by private companies. The utilities in such cases should also be duly credited with earnings for services furnished the municipality. Such rules are necessary, not only on equitable grounds, but in order that the figures under different ownerships may be comparable. In operating expenses, however, the situation is more perplexing, because in such cases the common items usually constitute a greater proportion of the total amounts. Before other allocations can be made, however, these common items must be properly distributed, and such distributions may be facilitated by the use of clearing accounts.

In jointly operated utilities, where transactions are closely interrelated, it is necessary in rate making to inquire carefully into the

records kept and the apportionments made. In many instances such inquiries lead to complete reapportionment. Take as an illustration a utility furnishing water, gas and electric service. Certain portions of pumping, production and power expenses will be common to all three, and must be divided. This operating labor should be divided according to hours, as shown from time cards, and steam generated on a basis of fuel consumption, etc. Some items could be charged directly, and distribution and consumption expenses could probably be apportioned actually. Commercial expenses would best be divided according to the number of consumers, and general expenses on the basis of the direct expenses. Undistributed expenses could perhaps be divided according to the proportion of utility equipment. Depreciation, taxes and interest are divided according to the investment. It would, of course, be impracticable to cover all the various accounting apportionments met with in public service management and regulation. I can only point out a few. Besides the problem of apportionment between joint utilities, there are the problems of apportioning between State and interstate business; between urban and interurban; between adjoining cities; between exchange and toll, etc. The more completely the companies introduce uniform practices in their financial and operating methods, the more readily these apportionments can be determined.

It is true that the classifications of the expenses and charges, as thus outlined, require many arbitrary apportionments, and many for this reason are inclined to question their propriety. While such allocations are sometimes made and erroneously used, their importance when correctly made has been clearly established.

As long as cost of service is the basis for rates, and as long as there are questions of management and operation to be solved, it is of first importance to the utility to have all the information that bears on operating expenses, depreciation, and rate of return, and upon the conditions by which these factors are affected. If the operating expenses of a given year are too low, it is important that all facts bearing on what are reasonable costs shall be presented. If local conditions are such that a comparison with other utilities is unfair, or of questionable value, this too should be shown. Such information is needed in order that the rates may be reasonable, the service adequate, and that the rights of both the public and the utility may be fully protected. Many utilities appear to be on a profitable basis when in reality they are not. Very often no provision is made for depreciation, and a utility may find itself with a worn out plant, and without a reserve to replace it. No utility can correctly judge the success of its business without knowledge of what constitutes reasonable amounts for all expenses and charges.

To the public, too, a knowledge of what constitutes reasonable amounts for such purposes is important. Without such information the public may either demand too low rates, or it may fail to obtain as favorable conditions as those to which it is entitled. A considerable proportion of the complaints against rates charged by public utilities may be fairly chargeable to conclusions drawn from defective or incomplete reports, prepared by the utilities themselves, and this situation is harmful to both the utilities and to the communities they serve.

(To be Continued.)

## Petroleum Production.

The great production of petroleum in 1911, was equaled and passed in 1912, when the total reached 222,538,604 barrels. Higher prices were the rule in 1912 except in California, and even in that State there was no material decline. The total value therefore increased markedly, reaching $164,087,342, or 22.41 per cent. above the value for 1911.

The greatest increase in quantity was in California, where the total advanced from 81,134,391 to 86,460,767 barrels, a gain of 6 55 per cent. Wyoming showed the remarkable gain from 186,695 barrels to 1,572,306 barrels. Operations in northern Texas more than offset the decline in the Gulf region and resulted in a significant gain for the State.

The volume of crude oil and products exported from the United States increased. Meanwhile the importing of gasoline from the East Indies was a favorable element in relieving the growing demand for this product on the Pacific coast.

The improved conditions in the export trade and the increased capacity of the refiners resulted in a marked decline in stocks in all fields except California.

The total stocks of all crude oils at the beginning of 1912 aggregated 138,000,000 barrels. By the close of the year they had declined to 125,000,000 barrels, a decrease of about 10 per cent. The decline was greatest in the fields east of the Rocky Mountains, 94,000,000 barrels to 79,000,000 barrels, a decrease of about 16 per cent.

The decline at once brought out a marked stimulation of prices all over the East, increasing the activity of drilling.

*Quantity and Value of Petroleum Produced and the Average Price per Barrel in* 1912.

| State. | Quantity (barrels). | Value. | Average Price per Barrel. |
|---|---|---|---|
| California | 86,450,767 | $39,213,588 | $0.454 |
| Colorado | 206,052 | 190,661 | 0.973 |
| Illinois | 28,601,308 | 24,332,605 | 0.851 |
| Indiana | 970,009 | 885,975 | 0.913 |
| Kansas | 1,592,796 | 1,095,698 | 0.688 |
| Kentucky | 484,368 | 424,842 | 0.877 |
| Louisiana | 9,263,439 | 7,023,827 | 0.758 |
| New York | 874,128 | 1,401,880 | 1.604 |
| Ohio | 8,969,007 | 12,085,998 | 1.347 |
| Oklahoma | 51,852,457 | 34,957,612 | 0.674 |
| Pennsylvania | 7,837,948 | 12,866,752 | 1.644 |
| Texas | 11,735,057 | 8,852,713 | 0.754 |
| Utah, Wyoming | 1,572,306 | 798,470 | 0.507 |
| West Virginia | 12,128,962 | 19,927,721 | 1.643 |
| Total for 1912 | 222,538,604 | $164,087,342 | $0.737 |
| Total for 1911 | 220,449,391 | $134,044,752 | $0.608 |

*Production, Increase or Decrease, by States, in* 1912, *Compared with* 1911.

| State. | Production (barrels). 1911. | Production (barrels). 1912. | Increase (barrels). | Decrease (barrels). |
|---|---|---|---|---|
| California | 81,134,391 | 86,450,767 | 5,316,376 | ..... |
| Colorado | 226,926 | 206,052 | ..... | 20,874 |
| Illinois | 31,317,038 | 28,601,308 | ..... | 2,715,730 |
| Indiana | 1,695,289 | 970,009 | ..... | 725,280 |
| Kansas | 1,278,819 | 1,592,796 | 318,777 | ..... |
| Kentucky | 472,458 | 484,368 | 11,910 | ..... |
| Louisiana | 10,720,420 | 9,263,439 | ..... | 1,456,981 |
| Michigan, Missouri | 7,995 | ..... | ..... | ..... |
| New York | 952,515 | 874,128 | ..... | 78,387 |
| Ohio | 8,817,112 | 8,969,007 | 143,900 | ..... |
| Oklahoma | 56,069,637 | 51,852,457 | ..... | 4,217,180 |
| Pennsylvania | 8,248,158 | 7,837,948 | ..... | 410,210 |
| Texas | 9,526,474 | 11,735,057 | 2,208,583 | ..... |
| Utah, Wyoming | 186,695 | 1,572,306 | 1,385,611 | ..... |
| West Virginia | 9,795,464 | 12,128,962 | 2,333,498 | ..... |
| Total | 220,449,391 | 222,538,604 | 2,089,213 | ..... |

# Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, July 10, 1913.

*The Jubilee Institution Meeting.—Two New Processes for Removal of Carbon Disulphide from Gas.*

Naturally the first thing to write about is the great event of the past month, the Jubilee Meeting of the Institution of Gas Engineers. Someone has rather unkindly remarked that only a small proportion of the members are qualified for that title, and is apparently under the idea that an "engineer" is a specialist in gas works construction. We have heard a good deal about the "specialist" lately; but, as a matter of fact, there is no better school of instruction for the design of gasworks apparatus than practical experience of its working. There is no special skill about factors of safety, allowances for wind stresses, and the strength of materials, and the services of authorities for testing the strength of materials are as much at the disposal of a small man as of a large. The very small percentage of accidents as compared with the class of machinery concerned in modern methods of gas manufacture, does not support the suggestion that the majority of the gasworks in this country are in charge of unqualified persons. The expression "gas engineer," has gradually come to be adopted in preference to that of "gas manager," as more nearly approaching an accurate presentation of the position. The actual

"manager" of the undertaking is the board of directors. So it would be difficult to improve upon the accuracy of the title.

The whole of the proceedings were carried through, under the exceptionally able guidance of Sir Corbet Woodall, with a capability and vitality that attracted attention far beyond the bounds of the profession. The President proved quite equal to keep things moving with a swing, whether at the business meeting, the Jubilee dinner, or in entertaining some 700 guests at his own home. No doubt he will make an equal success of the National Gas Exhibition in October. His announcement that the King and Queen had graciously consented to open it, carries great promise. In this connection it will be well not to lose sight of a criticism in the current issue of the "Illuminating Engineer." In a column devoted to a summary of the month's news, gas is passed over with a very short notice. "There is nothing in the gaspapers," the writer says, "they are all taken up with the report of the Jubilee meeting of the Institution of Gas Engineers, at which nothing was said about lighting." This remark will not pass unnoticed by those who claim that they have all the lighting business that is worth having, and they will not fail to twist it into a suggestion that gas lighting is a small affair not worth troubling about. Let us hope that there will be no room for a suggestion that there was "Nothing about lighting" in any review of the National Gas Exhibition. This supports a hint thrown out in my last letter to the effect that the attention of the Institution meetings should be confined to technical matters. Surely six hours in the year, which is about the time actually available for hearing and discussing papers, are not too much for this purpose. And the British Commercial Association can be left to deal with the selling end. Otherwise the District Associations, Senior and Junior, will soon outstrip the Institution in the technical race. The duties attaching to the head of the staff at the present day are so multifarious that he is at a disadvantage as compared with his assistants, and the heads of departments, in the matter of time and opportunity for special investigation and preparation of papers.

Amongst the more personal matters connected with the proceedings were the special congratulations from "over-seas." All the various European Associations were represented, and there was a specially strong contingent from Germany. The President commenced the proceedings by a graceful recognition of the presence of foreign visitors, to which Professor Bunte made an eloquent response. Members of kindred scientific societies were also well represented. At a later period congratulations from the American Gas Institute were ably conveyed in the preface to a paper on "Depreciation: Estimated and Actual," contributed by Dr. Alex. C. Humphreys, of New York, better known in this country as the head of the firm of Humphreys & Glasgow, of London. The presentation of the Newbigging portrait was the next event, and the President, after some well chosen remarks, unveiled the portrait, and it was greeted with prolonged and tumultous applause, partly due to the popularity of the subject, and partly to an appreciation of the skill of the artist, Mr. Tom. Moslyn, who has succeeded in producing a most lifelike and characteristic presentment.

Mr. Newbigging is 80 years of age, but still hale and hearty, and was able to make a vigorous and telling response. A little later the honorary secretary announced that Mr. Newbigging had further commemorated the Jubilee meeting by a handsome donation to the benevolent fund. Then there was the presentation of the Birmingham Medal to the President, a duty that was capably discharged by the President-elect, Mr. Edward Allen, of Liverpool.

The annual report of the Chief Inspector of Factories contains some brief references to gas. An explosion in a meter house, unfortunately attended with a fatal result, was due to the faulty construction of the overflow from the meter. Instead of consisting of an ordinary U-pipe, with short tip just below the top of the U, it was continued as a third descending limb, extending some distance below the base of the U. This admitted of a siphon action obtaining, until the pipe was empty and a clear passage left for the escape of gas. There were two accidents by gas poisoning at coke works, and in the Midlands slight cases of gassing in connection with suction gas plants are said to be common. A curious danger in connection with acetylene gas is instanced by a report of a case where escaping acetylene accumulated "under a workman's clothing," and, becoming ignited, caused serious injuries. The clothing that affords accommodation for a charge of explosive gas must be of a peculiar nature. In the case of laundry irons supplied with suction gas, there is evidence that the purification is incomplete, and arrangements to take away the fumes have been installed with satisfactory results. There have been a few fatalities in connection with tar stills, due to neglect of the precautions advised, such as the disconnection of gas pipes and wearing of life belts. A disaster due to neglect of advice can scarcely be classed as an accident. Out of 29 cases (2 fatal) of gas poisoning, 10 were at gas works, and included ascension pipes, repairing cracks in retorts, drawing a retort, emptying purifiers and repairing flues.

Electricians are in the habit of advertising their commodity as the safest and the healthiest light, but the report, as compared with the few cases above named, does not support that conclusion. During 1912 there were 334 accidents at public supply stations, electric railways and tramways, which are described as "non-electrical," being similar to accidents in any general engineering works, and of these 11 were fatal. And there were 58 electrical accidents, of which 4 were fatal. In addition there were, at other electricity works, 37 non-electrical and 16 electrical accidents. Taking the number of employees, which is much more numerous in the gas industry than in electric supply, the percentage of accidents is much larger with electricity than with gas.

Dr. C. C. Carpenter, Chairman of the South Metropolitan Gas Company, has submitted a most important paper, tracing the steps by which his Company have arrived at a practical solution of the sulphur difficulty, to the French Institution of Gas Engineers, at their annual meeting held at Toulouse. There is no reason why a French audience would appreciate this subject more than an English one, and the explanation was, that the French Society had for many years been giving attention to the problem. One can scarcely say that it has been neglected in England, and the long historical preface, extending over nearly 100 years, that leads up to the main feature of the paper, proves the contrary. Even as early as 1820, it was known that gas free from sulphureted hydrogen might still contain appreciable quantities of sulphur compounds, and further, that such compounds could be substantially reduced, if not entirely removed, by passage through red hot tubes. Dr. Carpenter carries his hearers through a long list of unsuccessful endeavors to apply this simple principle in practice, and the patient and persevering researches of his own chemists, have at last been attended with such a degree of success that the whole of the production at Old Kent Road, some 10 million cubic feet per 24 hours, is relieved to the extent of some 80 per cent. of the sulphur compounds. The gas to be purified is caused to pass through comparatively small tubes packed with balls 1 inch in diameter, and maintained at a temperature of 500° C. The temperature of the gas is raised to 400° C. before entering the tubes, partly at the expense of the out going gas. The balls are made of refractory earth, and are impregnated with reduced nickel obtained by reduction of the chloride in a current of hydrgen. The action is extremely simple being represented by the formula:

$$CS_2 + 2H_2 = 2H_2S + C.$$

One atom of carbon bisulphide combines with two atoms of hydrogen present in the gas, and forms two atoms of sulphureted hydrogen, which passes on with the gas and is removed by the usual means, and one atom of carbon, which is deposited on the balls. It is necessary to carry on the work with a number of units, so arranged that one or more can be put out of action and revivified by passing air through the tubes and burning the carbon. As soon as there is no sign of CO, at the outlet the process is complete and the unit can be put to use again. The procedure is exactly similar to the plan of running four or six oxide purifiers. The cost, exclusive of secondary purification from sulphureted hydrogen, is stated to be ¼ of a penny per 1,000 cubic feet of gas purified, sulphur compounds are reduced from 40 to 8 grains per 1,000 cubic feet, and the constitution of the gas is not prejudiced. The illuminating power, calorific value, naphthaline, illuminants and methane, are in no way affected, although previous experimenters on these lines have given up the process as impracticable, because the gas was otherwise affected. The reason leading to a successful issue are all explained in the paper, and it only remains to congratulate Dr. Carpenter on being able to bring laboratory experiments, extending over such a long period, to the domain of practical operation.

Another method of securing similar results has been tried on an experimental scale at Heidelberg, in Germany, and it formed the subject of two papers contributed to the German Gas Association at a recent meeting at Strassburg. It is particularly interesting to notice the agreement between the results obtained by Dr. Carpenter in London and those at Heidelberg. In each case about 7 grains sulphur remain in the finished gas per 100 cubic feet. Possibly in both cases the carbon disulphide is entirely removed, and the residue may con-

sist of sulphur in some other form. The apparatus required for the Heidelberg process comprises an ordinary scrubber or washer, a catch-pot, a lime purifier, and an ordinary dry purifier charged with a special dry material called Athion. Incidentally it includes the entire removal of carbonic acid from the gas, and the obtaining of the same in a pure form suitable for utilization by liquefaction or any desired method. It will be remembered that the necessity for first completely removing carbonic acid was the great difficulty in the way of the lime process, and it may here be remarked that the gas successfully treated by Dr. Carpenter contained 1.8 per cent. $CO_2$, which is the usual proportion after ample washing or scrubbing and oxide purification. It would not appear that Dr. Carpenter is now specially interested in the removal of carbonic acid. Returning to the Heidelberg process, the gas is treated in the washer with carbonate of potash in solution, which is maintained in circulation until it becomes converted into the bicarbonate. When sufficiently saturated, the solution can be regenerated by boiling, the second atom of carbonic acid being thus entirely displaced. The catch-pot collects any solution carried forward as a spray by the gas and the lime purifier retains the last traces of $CO_2$. The gas then passes through "Athion" material, which is a compound of alkali and cellulose, prepared by treating cellulose sulphide with soda lye. The porous material obtained by rolling and crushing to a state of fine division is spread on grids in the same way as oxide. The carbon disulphide in the gas converts the soda-cellulose into cellulose xanthogenate, or viscose, in which form it is claimed that the material is improved in value. The potassium carbonate removed 87 per cent. of the carbonic acid, reducing it from 2.7 to 0.35 per cent., and the lime removed the remainder, and "Athion" will absorb one-eighth of its weight of carbon disulphide. One ton should, therefore, be capable of dealing with 3 to 5 million cubic feet of gas. Reliable working results are not yet attainable, but it will be observed that the process not only aims at removing the impurities, but also turns them to profitable account. Up to the present ammonia is the only impurity that has attained important proportions on the credit side of the revenue account.

## New Methods and Appliances.

PORTABLE OPTICAL PYROMETER.—The "Shore Pyroscope," or optical pyrometer, was designed to combine the virtues of the electric pyrometers with a structure and simplicity suited to the requirements of the average tool room, heat treating shop, forge or foundry. It is less accurate (within 10° F.) than a first-class, perfectly calibrated pyrometer; but, whereas the latter is apt to vary somewhat after the exposure to continuous high heats, the pyroscope will continue accurate after years of constant use. The standard light used is a miniature kerosene flame, which form is used in preference to an electric light in that the quality of the light is found more uniform. All the parts are accessible for cleaning, and the operating expense is negligible, and, regarding its suitability for ordinary, unskilled labor, this description of its construction and use will go far to make things plain to the reader. The instrument, as illustrated, comprises an adjustable dip telescope, with a series of variable lenses, and an oil lamp of special form. The lenses are protected by glass shields which may be cheaply replaced in the event of breakage. (Fig. 1.)

To prepare the pyroscope, the container, *A*, is filled with kerosene, and the lamp lighted through the glass door, *B*, the flame being regulated by knob, *K*. As long as the flame is high enough to cover the reflector, *R*, the accuracy of the reading will not be affected by the size of the flame. In operating, the telescope has first to be focused by means of the knurled ring, *E*; the operator, meanwhile observing the hot metal or brickwork, through the eye piece, *C*. This part of the operation is identical with the focusing of an opera glass, or other focusing optical instrument. (Fig. 2.) The second stage is to regulate, by the knurled knob, *F*, a colored diaphragm, which throws rays from the lamp upon the reflector, *R* (not shown), until they correspond exactly with the rays emitted by the heated bodies, and no difference is seen between the glow of the reflector and that of the hot body being pyroscoped. The adjustment of the colored shutter causes a movement of the calibrated drum, *G*, against the fixed indicator, *H*. The temperature is then read from this indicator, either in degrees F. or C., both scales being given. When it is desired, as may often be the case in dealing with a number of duplicate pieces, heat each of them to a common temperature; a screw, *M*, is furnished for locking the calibrating parts of the instrument.

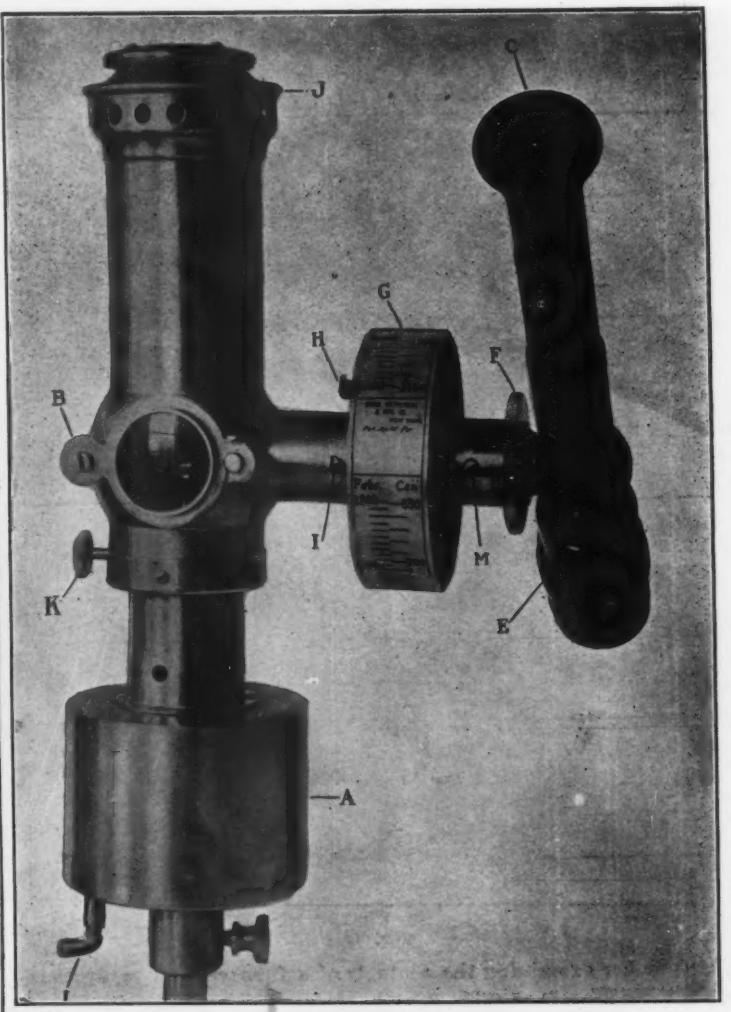



Fig. 1.

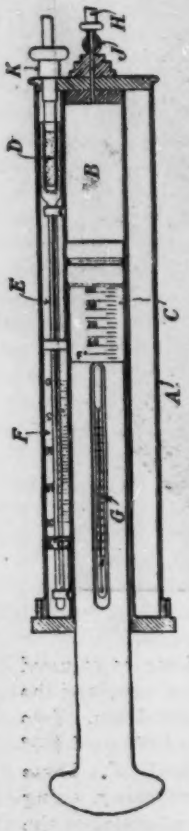
Fig. 2.

The pyroscope is supplied with a tripod-stand, and can be adjusted to any reasonable height. It also swivels about its axis, and the telescope is independently adjustable for tilting up and down. Two tubes are listed. Type, *A*, is calibrated to read from 1,200° to 2,100° F., type, *B*, being calibrated to read from 2,000° to 3,000° F. These instruments are particularly adapted for heating processes, using modern gas fired furnaces. Each individual piece of metal in the furnace can be observed separately, and its temperatures determined, without emanations from other pieces affecting the reading; and thus each piece can be removed at just the right time. Fig. 3 shows

Fig. 3.

a tool maker examining the contents of a furnace, and ready to remove them as soon as sufficiently heated.

A SIMPLE $CO_2$ METER.—An extremely simple appliance for determining the quantity of $CO_2$ in flue gases, brought out recently in England, is described in *Engineering*. Like all such appliances it depends on the absorbing power of caustic soda, but it is the thermal effect of the absorption that is used in calculating the quantity of $CO_2$, the amount of heat developed by the chemical action between $CO_2$ and caustic soda being proportional to the amount of $CO_2$ in the flue gases. If, therefore, a measured quantity of the gas to be analyzed is brought into contact with caustic soda, in amount rather more than is sufficient to absorb all the $CO_2$ present; then by measuring the amount of heat evolved the quantity of $CO_2$ present can be determined. The instrument carried out these simple operations.




It consists of a casing, *A*, which contains a cylinder, *B*, the latter being fitted with a plunger, *C*, with cup leathers, for drawing a measured quantity of mixture from the flue; and afterwards passing it through a cartridge-shaped container, *D*, in which is the dry pulverized caustic soda. Around this container is the bulb of a thermometer, *E*, which indicates the temperature of the chemical reaction, and registers on the scale, *F*, the percentage of $CO_2$ in the gases. On the plunger is another thermometer, *G*, the scale of which can be seen through a slot in the outer casing, *A*. The scale, *F*, is movable, arranged to slide in this slot. Connection is made between the cylinder, *B*, and the cartridge, *D*, by the rubber tube, *H*, attached to the tap, *J*. To correct the volume of the gas taken into the cylinder, *B*, for temperature, the length of travel of the piston, *C*, is regulated according to the temperature indicated on the thermometer, *G*.

When making an analysis, the caustic soda cartridge, before being placed in the receptacle, *D*, is pricked at the ends to enable the gas to flow through; it is then attached to the rubber connection, and inserted and held in place within the bulb of the thermometer, *E*, by the plug, *K*. A sample of the gas is then drawn into the cylinder. The necessary correction for temperature is made, and the free end of the rubber tube, *H*, is connected to the cylinder nozzle. The movable scale, *F*, is then adjusted so that the zero point is opposite the top of the mercury column of the thermometer, *E*, and the piston, *C*, is depressed. This forces the gas mixture through the caustic soda cartridge, the temperature rises, and when the mercury in the thermometer indicates the highest point, a direct reading of the percentage of the $CO_2$ is taken from the scale.

## Items of Interest
### FROM VARIOUS LOCALITIES.

"B. G." informs us that Mr. George W. Briggs, the successor to Mr. A. P. Wood, as Manager of the Mt. Clemens (Mich.) Gas Light Company, is now active in his new field. Mr. A. P. Wood continues as Commercial Agent.

MR. BRIGGS' promotion has been well earned. Starting in the gas business in Jackson, Mich., about 20 years ago as a fitter's helper, he subsequently located in Toledo, O., and left there to act as Superintendent of the Citizens Gas Company, Elyria and Lorain, O. At the end of 4 years he took charge of the gas division of the gas and electric lighting plant of the Westerly (R. I.) Company, and left there 2 years later to assume the management of the plant at Michigan City, Ind. He is a capable man.

MR. W. J. CALLAHAN, formerly Manager of the Empire Gas and Electric Company's trading in Seneca Falls and Waterloo, N. Y., has been named to take charge of its Newark and Palmyra (N. Y.) plant, with headquarters in Newark. Mr. Siler, of Newark, succeeds Mr. Callahan at Seneca Falls. Still another change in the district is the resignation of Superintendent Charles H. Utter, who has acted as Superintendent at Newark since 1897. Mr. Utter goes to Grinnell, Ia., from where he will manage the properties west of the Mississippi river for the Federal Light and Power Company, Boston, Mass.

A THOROUGHLY well satisfied man is superintendent Johnson, of the Perry (Ia.) Gas Company, who, at the close of the day's work, ended the 16th inst., announced the completion of plant rehabilitation, and the ending of the main extension scheme. The latter meant the placing of 6 additional miles; and the cost of this work to the controlling interest (held by Mr. John A. Reed, of Cedar Rapids, Ia.), amounted to $40,000.

THE Washington (D. C.) *Herald*, in commenting on the recent marked advance (on the 16th inst. it closed at 90, or within ⅜ths point of the record for it) in shares of the Washington Gas Light Company, had this to say: "It may be that the coterie of buyers has in mind the annual election next February of a President. The incumbent of the new office of General Manager is not a candidate for the presidency. * * * Mr. Reeside becomes Acting President next September, during the time Mr. Leiter is voyaging round the world; but he is not a candidate for the office in 1914. This is positive. There isn't a question that gas is strong, and that the kind of buying that has been going on for a couple of weeks will put it higher."

"B. L. B.," writing from Chicago, under date of the 21st inst., incloses this mention: "The North Shore Gas Company, of Chicago, formerly the North Shore Consolidated Gas Company, will redeem, the 1st prox., all the outstanding first mortgage, 25-year, 5 per cent. bonds, due 1937, at 105 and accrued interest to the date of call. The Trustees of the mortgage are the Continental and Commercial Trust and Savings Bank, of Chicago, and the First National Bank, of New York. The North Shore Gas Company is controlled through the ownership of all its $1,000,000 preferred and $2,000,000 common stock by the Chicago Suburban Gas and Electric Company, organized in 1912. The mortgage securing the North Shore gas bonds provides that, after June, 1914, the Company shall set aside 10 per cent. of its gross receipts from the sale of gas and by-products for the redemption of these bonds, or for betterments to its property, and it is probably this large sinking fund clause which has resulted in the decision to retire the issue."

THE Old Colony Gas Company, of Massachusetts, at the close of its fiscal year (ended the 30th ult.) had 2,700 consumers, as against 1,200

the corresponding year a twelvemonth ago. During the year it has supplied gas to the residents of Abington, Braintree, Reckland, Weymouth and Whitman. Now a part of Hingham has been added, and piping to complete the system is underway. When Hingham is fully hooked up, the Company's territory will hold close to 50,000 population, all of a class that is bound to bring grist to its mill. The Company is constantly reporting a steady increase in gross and net, the latter for the year being almost twice as large as in the preceding year."

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THE De Pere (Wis.) *News* of recent date states that the Green Bay Gas and Electric Company will have to charge consumers of fuel gas in that city a net rate of $1.15, instead of $1, as promised by the Company when the Council granted it permission to distribute gas in De Pere. That, however, was not the Company's proposition, and the rating is made to comply with a decision handed down by the Railroad Rate Commission. When the authorities of Green Bay complained to the Commission against the Water Company's rates they also complained against the Gas Company's schedule, which was $1 for fuel gas and $1.40 on lighting account, the plan, of course, necessitating the use of two meters. The decision of the Commission abolished the discrimination, and hereafter the charge shall be $1.05 per 1,000 for the first 1,000 cubic feet, and 90 cents for all over 5,000 cubic feet. It might be, though, that a discrimination will later become effective, bringing a schedule provision to the effect that successive reductions (say 5 cents) per 1,000 will rule."

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RECENT advices from Detroit are to the effect that, the Detroit City Gas Company has virtually completed negotiations by means of which it will acquire the plant and franchises of the Detroit and Suburban Gas Company, the latter being the purchaser (1909) of the Detroit Gas and Coke Company. The Detroit and Suburban Company has a capitalization of $600,000 and outstanding notes aggregating $1,000,000, and its franchise is active to 1930. The Detroit and Suburban Company's shareholders will meet the 31st inst. to determine the sale. The officers of the Company are: Directors, C. H. Geist, N. M. Seabrease and J. C. Elston; President, C. H. Geist; Vice-President, N. M. Seabrease; Secretary and Treasurer, J. G. Diffenderfer; Auditor, C. H. Weak.

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AT the annual meeting of the Municipal (Albany, N. Y.) Gas Company no action was taken in respect of the matter of increasing the capital stock, such inactivity being mainly due to the absence of Mr. A. N. Brady, who was on his way to Europe. The officers chosen were: Directors, James B. McEwan, Anthony N. Brady, Chas. Gibson, Robt. C. Pruyn, Jno. A. Delehanty, John Bowe and Edward B. Cantine; President, A. N. Brady; Vice-President, Robert C. Pruyn; Treasurer and Secretary, E. P. Gavit.

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THE Western United Gas and Electric Company has been granted the right to supply gas for a term of 50 years in the settlement of Yorkville, Ills.

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MR. A. V. BURTIS, writing from Sea Cliff, Long Island, N. Y., under date of the 22d inst., says that County Judge John R. Vunk, as Attorney for the Consumers Gas Company, of Long Island, recently made application to the Town Board of Riverhead for the right to there construct and operate a gas works. The franchise life sought is to cover a period of 50 years, and the Company agrees to sell at a rate not to exceed $1.50 per 1,000 cubic feet; further, it will maintain without charge one 22-candle power lamp in front of all the public buildings, public schools and fire engine stations. And it is also declared that the projectors will have the plant in operation within two years from date of franchise.

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A CORRESPONDENT in Brenham, Tex., under date of the 16th inst., thus frees his mind: "Well, this section of the Lone Star State has a gas supply; and possibly 'the people' are not getting ready to declare themselves denizens of a 'Metropolis!' Last Thursday, George Tucker, a 'localler,' whose belief in the usefulness of gas as an adjunct to the growth of Brenham was strong enough to induce him to invest considerable 'real money' in the gas undertaking, turned the valve that permitted the flow of steam into the holder tank, and at least 500 Brenhamites watched the huge iron or steel retainer rise above the surroundings as the air 'entered its midst.' The holder, having been found all right, a regular supply of gas will be sent through the holder and mains before a week goes into another one."

THE Memphis (Tenn.) *Scimitar*, of the 16th inst., says that arrangements have been made to remove, as far as possible, the Mill avenue plant of the Memphis Consolidated Gas Company to the new site on Kansas street and McLemore avenue, at which point the Company has for some time had a holder station. A new generating plant will be constructed, and the gross cost of the construction and reconstruction will not be less than $200,000. A marked advantage of the new location is that it will place the works at an elevation sufficient to make negligible any sudden inrush of floods.

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CERTAIN capitalists of Elkton, Md., have started a proposition having the construction of a gas works in view. Why the need of this undertaking (under the circumstances) is hard to discover.

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MR. S. T. STALLINGS, the new Manager of the Southern Gas Improvement Company, is on the job. He succeeds Mr. J. W. Lynch, who has been transferred to the Superintendency of the works at Rock Hill, S. C. Mr. Lynch is well-known (better still, well-liked) in the community.

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GENERAL MANAGER RHOADS, in conversation with a local newspaper man, made the following statement respecting the recent revision of selling rates by the Northern Central (Pa.) Gas Company, which reduction was noted in a prior issue of the JOURNAL: "Complying with the request of a very large number of patrons, the Company has decided to abandon the use of separate meters for illuminating and fuel gas, and install only one meter through which all the gas can be consumed, whether used for lighting, heating or power. In the schedule a marked reduction will be noted in rate per 1,000 ($1.40) for illuminating and a slight increase (20 cents) in the rate on fuel account. In other words, a joint rate on both accounts ($1.20) became effective July 1st. It is estimated that the saving to the public, in having only one system of piping instead of two, will amount to $4,000 per year. The single meter system will also do away with the annoyance of separate bills and by combining the various uses of gas in the way of illumination, fuel and other methods of use through one meter will be further advantageous to all consumers, inasmuch as it will give the advantage of further reductions on quantities in excess of 1,000 cubic feet. This averaging of the existing rates and reductions on the larger quantities of gas is made in the face of greatly increased price of all materials used in the manufacture of gas. All expense of changing of meters, where two meters are now in use and the connection of light and fuel systems will be borne by the Gas Company."

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ADVICES from Du Quoin, Ills., under date of the 20th inst., are to the effect that sufficient encouragement has been given to the project, under which it is proposed to supply gas from a central point to the Illinois settlements of Benton, Johnston City, Marion, Carterville, Christopher, Carbondale, West Frankfort and Herrin, to warrant the assertion that the scheme will be shortly underway.

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THE earnings of the Pacific Gas and Electric Company continue to show large increases, especially along the lines of demand for gas on fuel account. This is notably so in respect of the Company's service in San Francisco.

# Recent Patent Issues.

**Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.**

1,065,913. Gas Regulating Valve. A. W. Bice, London, Ontario, Canada.

1,065 961. Automatic Gas Lighter. J. A. Nelson, Davenport, Ia.

1,065,973. Gas Regulator. S. C. Shaffner, East Orange, N. J.

1,065,974. Device for Testing Pressure, Specific Gravity, and Volume of Gases. S. C. Shaffner, East Orange, N. J.

1,066,023. Gas Meter. C. & R. W. Lawson, Boston, Mass.

1,066,060. Cylinder or Globe for Inverted Incandescent Gas Burners. P. Storrs, Owego, N. Y., assignors to Storrs Mica Co., same place.

1,066,252. Method of Regulating Generation in Gas Producers and Apparatus therefor. LeR. C. Chowning, Corning, N. Y., assignor of 26/100 to A. B. Houghton and 26/100 to A. A. Houghton, same place.

# The Market FOR GAS SECURITIES.

Despite a very uneven general market, although showing a decided disposition towards an advance on all sides, Consolidated gas scored a net gain of 1½ in the bid in the trading for the week. It came in this morning (Friday) at 131½ to 132. Several hundred shares changed hands, but advances were recorded in the times of largest offerings. The technical position of the Company improves daily, and the possessions in Queens County are developing far beyond the estimate of those who advised the lighting acquisitions on Long Island.

In other shares Brooklyn Union gas is a point higher in the bid; but such a bid, 125! The position of Brooklyn Union to-day is rather more impregnable to vicissitude than is any other Company in the country. What if the State will only allow 6 per cent. dividends? The book value is there, and, even on a 6 per cent. basis, the shares should be selling at least for 150; that is, if underlying security is that which makes for investment value. Peoples, of Chicago, recorded a smart advance in the week, having sold at 116. To-day it is 115 bid, asked 115½. Lacledes are somewhat better, but very far from quotations that are positive indications of its real health. The Railroad Commissioners, of California, have declared invalid an issue of $635,000, 30-year 5 per cent. bonds by the Economic Gas Company, of Los Angeles, Cal. These are the major portion of an allowed issue by the Commissioners; or the Commissioners assented to the emission of $270,000, and the Company put out $930,000. Washington (D. C.) climbed to 100—or 5 times par—the mid-week of July, and then receded to 98¾. Something must be underway there. In one day the transactions totaled 4,340 shares. The Municipal Gas Company (Albany, N. Y.) has declared a regular quarterly of 2½ per cent., payable the 1st prox.

## Gas Stocks.

**Quotations by George W. Close, Broker and Dealer in Gas Stocks.**

115 BROADWAY, NEW YORK CITY.

JULY 28.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par alue of $100 per share:

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked* |
|---|---|---|---|---|
| Consolidated Gas Co. | $99,816,500 | 100 | 131¼ | 132 |
| Central Union Gas Co.— | | | | |
| 1st 5's, due 1927, J. & J. | 3,500,000 | 1,000 | 101 | 108 |
| Equitable Gas Light Co.— | | | | |
| Con. 5's, due 1932, M. & S. | 1,000,000 | 1,000 | 105 | 106 |
| Mutual Gas Co. | 8,600,000 | 100 | 157 | 157 |
| New Amsterdam Gas Co.— | | | | |
| 1st Con. 5's, due 1948, J. & J. | 11,000,000 | 1,000 | 99 | 101 |
| New York & Richmond Gas Co. (Staten Island) | 1,500,000 | 100 | 59 | 63 |
| 1st Mtg. Gold Bds. 5 p. ct. | 1,500,000 | — | 98½ | 100½ |
| New York and East River— | | | | |
| 1st 5's, due 1944, J. & J. | 3,500,000 | 1,000 | 103 | 105 |
| Con. 5's, due 1945, J. & J. | 1,500,000 | — | 96 | 100 |
| Northern Union— | | | | |
| 1st 5's, due 1927, J. & J. | 1,350,000 | 1,000 | 100 | 102 |
| Standard | 5,000,000 | 100 | 102 | 104 |
| Preferred | 5,000,000 | 100 | 93 | 94 |
| 1st Mtg. 5's, due 1930, M. & N. | 1,500,000 | 1,000 | 91 | 93 |
| The Brooklyn Union | 15,000,000 | 1,000 | 125 | 129 |
| 1st Con. 5's, due 1948, M. & N. | 15,000,000 | — | 105¾ | 107 |
| Yonkers | 399,650 | 500 | 180 | — |
| *Out-of-Town Companies.* | | | | |
| Binghampton Gas Works | 450,000 | 100 | — | — |
| " 1st Mtg. 5's | 500,000 | 1,000 | 97 | 100 |
| Boston United Gas Co.— | | | | |
| 1st Series S. F. Trust | 7,000,000 | 1,000 | 82 | 85 |
| 2d " " " | 3,000,000 | 1,000 | 47½ | 50 |
| Buffalo City Gas Co. | 5,500,000 | 100 | 5 | 8 |
| Bonds, 5's | 5,250,000 | 1,000 | 59 | 60 |
| Capital, Sacramento | 500,000 | 50 | — | 35 |
| Bonds (5's) | 150,000 | 1,000 | — | — |
| Chicago Gas Co. Guaranteed Gold Bonds | 7,500,000 | 1,000 | 104 | 105¼ |
| Columbus (O.) Gas Co., 1st Mortgage Bonds | 1,500,000 | 1,000 | 96 | 98 |
| Columbus (O.) Gas Lt. & Heating Co. | 1,682,750 | 100 | 90¼ | 91 |
| Preferred | 3,026,500 | 100 | 75¼ | 80 |
| Essex and Hudson Gas Co. | 6,500,000 | — | 133 | 136 |
| Fort Wayne | 2,000,000 | — | — | — |
| " Bonds | 2,000,000 | — | 55 | — |
| Grand Rapids Gas Light Co., 1st Mtg. 5's | 1,350,000 | 1,000 | 100 | 101 |
| Hartford | 750,000 | 25 | 190 | 200 |
| Hudson County Gas Co., of New Jersey | 10,500,000 | — | 120 | 122 |
| " Bonds, 5's | 10,500,000 | — | 104 | 106 |
| Indianapolis | 2,000,000 | — | 7 | 80 |
| " Bonds, 5's | 2,650,000 | — | 30 | 98 |
| Jackson Gas Co. | 250,000 | 50 | 82 | — |
| " 1st Mtg. 5's | 290,000 | 1,000 | 97 | 100 |
| Cincinnati Gas and Electric Co. | 29,500,000 | 100 | 87 | 90 |
| Kansas City Gas Light Co., of Missouri | 5,000,000 | 100 | — | 86 |
| Bonds, 1st 5's | 3,822,000 | 1,000 | 98½ | 99 |
| Laclede Gas Co., St. Louis. | 10,000,000 | 100 | 95 | 100 |
| Preferred | 2,500,000 | 100 | — | 102½ |
| Bonds | 10,000,000 | 1,000 | 102½ | 103 |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | — | 60 |
| Bonds | 1,000,000 | 1,000 | 60 | 65 |
| Louisville | 2,570,000 | 50 | 120 | 120 |
| Madison Gas and Electric Co. | | | | |
| " 1st Mtg. 6's | 400,000 | 1,000 | 106 | |
| Massachusetts Gas Companies, of Boston | 25,000,000 | 100 | 90½ | 91 |
| Preferred | 25,000,000 | 100 | 89 | 90 |
| Montreal L. H. & P., Canada | 9,000,000 | 100 | 211 | 212 |
| Nashville Gas Light Co. | 1,000,000 | 100 | 110 | — |
| Newark, N. J., Con. Gas Co. | 6,000,000 | — | 97 | 98 |
| Bonds, 6's | 6,000,000 | — | 127 | 128 |
| New Haven Gas Co. | 5,000,000 | 25 | 188 | 190 |
| Peoples Gas Lt. & Coke Co., Chicago | 25,000,000 | 100 | 115 | 1'5¾ |
| 1st Mortgage | 20,100,000 | 1,000 | 102 | 102½ |
| 2d " | 2,500,000 | 1,000 | 104 | — |
| Rochester Gas & Electric Co. | 2,1.3,000 | 50 | 88 | — |
| Preferred | 2,150,000 | 50 | 118 | — |
| Consolidated 5's | 2,000,000 | — | 104¾ | 105½ |
| Pacific Gas and Electric Co. | 15,500,000 | — | 42 | 43 |
| St. Joseph Gas Co.— | | | | |
| 1st Mtg. 5's | 1,000,000 | 1,000 | 93 | 94 |
| St. Paul Gas Light Co. | 2,500,000 | 100 | — | — |
| 1st Mortgages, 6's | 650,000 | 1,000 | 104 | 105 |
| Extension, 6's | 600,000 | 1,000 | 112½ | 115 |
| General Mortgage, 5's | 3,447,000 | 1,000 | 94 | 96 |
| Syracuse Gas Co., N. Y. | 1,975,000 | 100 | 50 | 55 |
| Bonds | 2,047,000 | 1,000 | 101 | 103 |
| Washington (D. C.) Gas Co. | 1,600,000 | 200 | 498 | 500 |
| 1st Mortgage, 6's | 600,000 | — | — | — |
| Western Gas Co., Milwaukee | 4,000,000 | — | — | — |
| Wilmington (Del.) Gas Co. | 600,000 | 50 | — | — |

# MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

*American Gas Institute.*—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. city.

*Canadian Gas Association.*—Annual meeting Sept. 1913. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

*Empire State Gas and Electric Association.*—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

*Gas Meters.*—Monthly Section Meetings; Grand Commissioner, I. W. Petty, New York; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, W. H. Pettes; Secretary, G. E. Smith, Sipp Avenue, Jersey City, N. J. Philadelphia Section; Chairman, L. R. Dutton; Secretary, H. F. Patterson, Jr., 833 Chestnut street. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, T. W. Jennings, Boston; Sec., F. K. Wells, 69 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman.

*Guild of Gas Managers of New England.*—Annual meeting, March, 1914. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

*Illinois Gas Association.*—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

*Illuminating Engineering Society.*—Annual meeting,———— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

*Indiana Gas Association.*—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

*Iowa District Gas Association.*—Annual meeting, May, 1914; ———— Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

*Kansas Gas, Water and Electric Light Association.*—Annual meeting, October—— 1913. ———— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

*Michigan Gas Association*—Annual meeting, September, 17, 18, 19, 1913; ———— Officers: President, W. S. Blauvelt, Detroit, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

*Missouri Electric Light, Gas, Water Works and Street Railway Association.*—Annual meeting, April, 1913; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

*National Commercial Gas Association.*—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

*Natural Gas Association.*—Annual meeting, St. Louis, Mo., May 19 and 20, 1914; Officers: President, E. L. Brundrett, Kansas City, Mo.; Secy-Treas., T. Clive Jones, Delaware, O.

*New England Gas Association.*—Annual meeting, February, 18th and 19th, 1914, Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

*New Jersey State Gas Association.*—Annual Meeting, July —, 1913, Asbury Park N. J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N. J.

*Ohio Gas Association.*—Annual meeting, February ——— 1914, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

*Oklahoma Gas, Electric and Railway Association.*—Annual meeting, Oklahoma City, May, ——1914. President, F. R. Bowman, Ada; Secretary-Treasurer, H. V. Bozel, Oklahoma City.

*Pacific Coast Gas Association.*—Annual meeting, San Jose, Cal., September 16, 17, 18, 1913. Officers: President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

*Pennsylvania Gas Association.*—Annual meeting, Allentown, Pa., April ———, 1914; Officers, President, J. A. Frick, Allentown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

*Society of Gas Lighting.*—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

*Southern Gas Association.*—Annual meeting, Mobile, Ala., April 4, 1914, Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

*Southwestern Electrical and Gas Association.*—Annual meeting. May———— 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

*Wisconsin Gas Association.*—Annual meeting, May ————1914, Milwaukee, Wis. Officers: President, Ewald Hasse, Milwaukee, Wis.; Secretary-Treasurer, Henry Harnan, Milwaukee, Wis.